Author tshingombe tshitadi

Curriculum assessment:

Career Education Didactic Report

Author: Tshingombe Tshitadi Theme: Curriculum Assessment in Trade & Engineering Education

🕮 Overview

This report examines the integration of career education materials, award certificates, diplomas, prizes, and innovative didactic systems within trade and engineering education. It emphasizes curriculum assessment, learner evaluation, and audit-ready documentation.

📚 Scope

- Trade and engineering education at advanced levels
- Credentialing systems: certificates, diplomas, prizes
- Didactic materials: quizzes, evaluation rubrics, learner dashboards
- Innovation and invention recognition in wholesaler and technical contexts

📝 Abstract

Career education thrives when didactic rigor, credentialing, and innovation are combined. This report explores curriculum assessment frameworks, management systems, and audit principles to ensure transparent learner recognition and sustainable educational reform.

🎯 Purpose

- To evaluate career education materials and credentialing systems
- To design audit-ready certificates and diplomas
- To integrate innovation and invention into trade wholesaler education
- To establish transparent quiz and mark evaluation systems

🔑 Keywords

Career education, didactic report, award certificate, diploma, prize, innovation, invention, trade engineering, wholesaler, quiz, evaluation, curriculum assessment, audit, management system.

📄 Description

The report describes how career education materials can be structured into audit-ready frameworks, ensuring learners receive visible recognition through certificates, diplomas, and prizes. It highlights innovation in trade engineering and wholesaler systems.

⚠ Problematic

- Lack of standardized credentialing across trade education
- Limited recognition of innovation and invention in curricula
- Inconsistent evaluation methods and mark allocation
- Weak audit systems for compliance and transparency

📄 Statement Report

This report asserts that career education must integrate didactic rigor, credentialing, and innovation recognition to empower learners and align with regulatory frameworks.

📑 Management System Information

- Learner dashboards for progress tracking
- Digital credentialing systems (badges, certificates, transcripts)
- Audit-ready documentation aligned with councils and authorities

🔍 Principle Investigation

- Alignment of curriculum with regulatory standards
- Evaluation of innovation in trade wholesaler education
- Transparency in quiz and mark evaluation systems

Method Research

- Comparative analysis of credentialing frameworks
- Case studies of trade engineering education
- Surveys of learner and educator experiences
- Audit of management systems for compliance

✅ Advantages

- Transparent credentialing and recognition
- Motivation through prizes and innovation awards
- Audit-ready documentation for compliance
- Learner empowerment via gamified dashboards

❌ Disadvantages

- High administrative burden for audit systems
- Risk of over-standardization limiting creativity
- Resource-intensive management systems

📄 Management System Information (Expanded)

- Integration of LMS with credentialing dashboards
- Automated quiz banks and evaluation rubrics
- Secure audit trails for certificates and diplomas

📊 Conclusion

Career education in trade and engineering requires a balance of didactic rigor, credentialing, and innovation recognition. Audit-ready systems ensure transparency, while prizes and certificates motivate learners to achieve and invent.

💼 Audit

- Verification of certificate and diploma authenticity
- Compliance with national and international councils
- Continuous monitoring of learner progress and evaluation systems

📚 Bibliographic (Sample References)

- Council on Higher Education (CHE) guidelines
- Engineering Council of South Africa (ECSA) standards
- UNESCO TVET frameworks
- International Journal of Technical Education & Training

This structure gives you a **complete academic-style report** that can be adapted into curriculum assessment documentation, certificate design, or audit frameworks.

Would you like me to **expand this into a polished certificate/diploma template** (with placeholders for learner details, marks, and achievements), or into a **sample quiz bank with evaluation rubrics** to demonstrate the assessment system? Both would make this report more tangible.

Career Education Didactic Report

Author: Tshingombe Tshitadi Focus: Curriculum Assessment, Credentialing, and Innovation in Trade & Engineering Education

🎓 Introduction

- **Purpose**: To evaluate career education pathways in engineering and trade wholesaling.
- **Scope**: Didactic materials, award certificates, diplomas, and innovative credentialing systems.
- **Audience**: Educators, regulators, learners, and trade professionals.

📘 Career Education Material

- **Curriculum frameworks**: Structured modules aligned with regulatory standards.
- **Didactic tools**: Manuals, digital dashboards, and gamified learning aids.
- **Assessment artifacts**: Exam banks, mark evaluation rubrics, and learner progress trackers.

🎖️ Award Certificates & Diplomas

- **Certificates**: Audit-ready recognition of short courses and trade skills.
- **Diplomas**: Advanced qualifications in engineering and wholesaling.
- **Prizes & innovation awards**: Incentives for invention, creativity, and applied trade solutions.

⚙️ Innovation & Invention in Trade Engineering

- **Applied projects**: Learners design trade solutions with engineering principles.
- **Wholesaler focus**: Advanced logistics, compliance, and technical distribution.
- **Recognition**: Badges, medals, and certificates linked to innovation outcomes.

📊 Quiz, Marking & Evaluation

- **Quiz banks**: Modular, randomized question sets for fair assessment.
- **Mark evaluation**: Weighted rubrics ensuring transparency and compliance.
- **Feedback loops**: Learner dashboards showing achievement, gaps, and progression.

📝 Curriculum Assessment

- **Alignment**: Mapping outcomes to national and international standards.

- **Moderation**: Ensuring fairness, inclusivity, and audit readiness.
- **Continuous improvement**: Iterative updates to reflect trade and engineering innovations.

🌍 Conclusion

Career education in trade and engineering thrives when **didactic rigor**, **credentialing systems**, and **innovation recognition** are integrated. Certificates, diplomas, and prizes not only validate achievement but also inspire learners to invent, innovate, and contribute to global wholesaling and engineering systems.

This structure gives you a **report-style document** that can double as curriculum assessment material and a foundation for award certificate/diploma design.

Would you like me to expand this into a **sample award certificate layout** (with placeholders for learner names, marks, and achievements), or into a **quiz bank** that demonstrates the evaluation framework? Both would make your curriculum assessment more tangible.

☞ Do you prefer me to build out sample certificate and diploma templates or quiz and evaluation examples?

Contents

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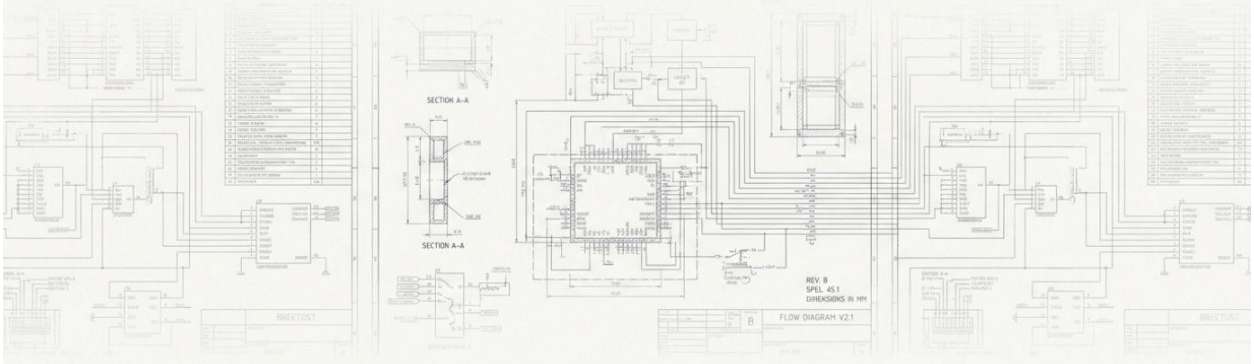
The Audit-Grade Career Engine

A Blueprint for Verifiable Competence



A modular framework that synthesizes formal education, vocational training, and workplace experience into a single, auditable system.

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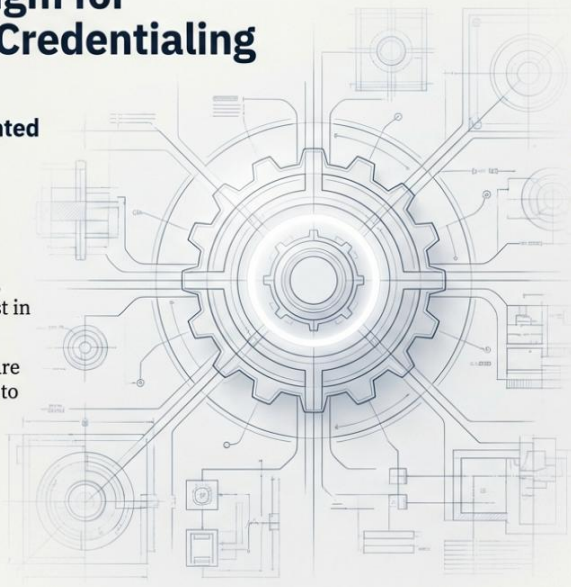
A New Paradigm for Professional Credentialing

The Challenge: Fragmented Competence

- Resumes are static, self-reported, and difficult to verify.
- Formal qualifications (e.g., diplomas, certificates) exist in siloed databases.
- Practical, hands-on skills are rarely quantified or linked to formal credentials.



The Solution: An Integrated, Data-Driven System

- A modular system that maps every skill, qualification, and experience to a verifiable data point.
- Utilizes a quantitative backbone to measure outcomes, from project costs to energy harvested.
- Generates audit-grade documentation for accreditation bodies like SAQA, AIU, and ASIC.

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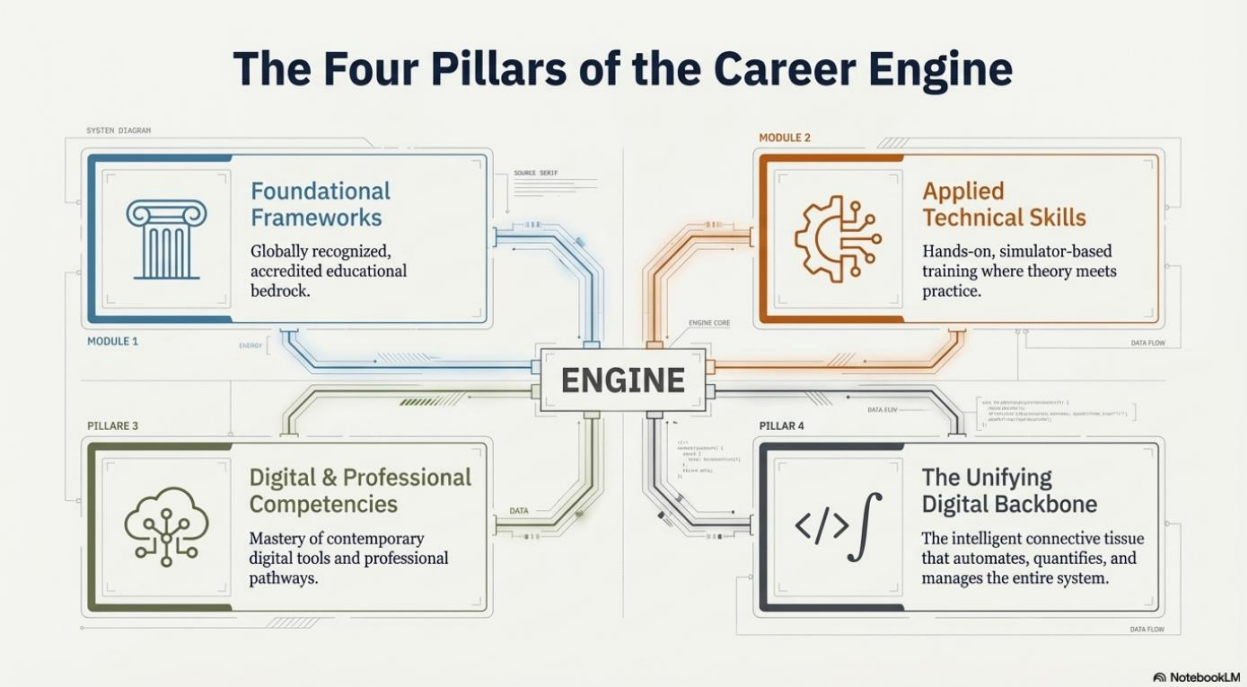
The Four Pillars of the Career Engine
SYSTEM DIAGRAM
Foundational Frameworks
Globally recognized, accredited educational bedrock.
MODULE 1
MODULE 2
Applied Technical Skills
Hands-on, simulator-based training where theory meets practice.
ENGINE
PILLAR 3
Digital & Professional Competencies
Mastery of contemporary digital tools and professional pathways.
PILLAR 4
The Unifying Digital Backbone
The intelligent connective tissue that automates, quantifies, and manages the entire system.
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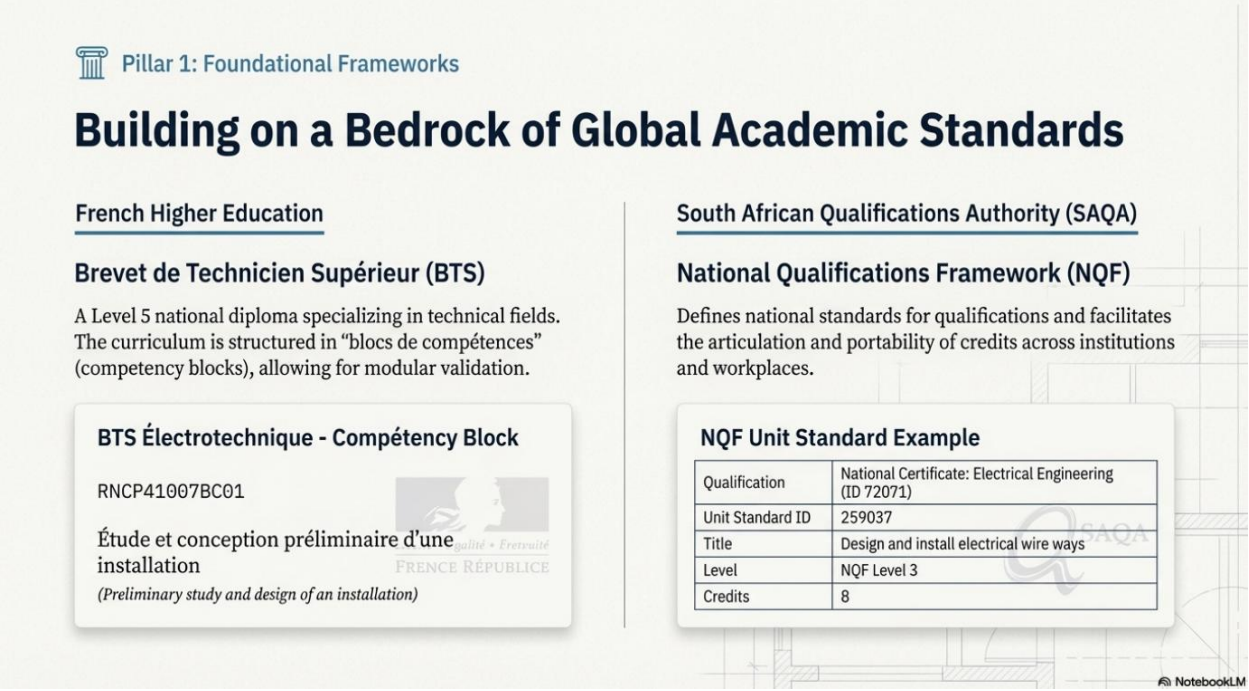
Pillar 1: Foundational Frameworks
Building on a Bedrock of Global Academic Standards
French Higher Education
Brevet de Technicien Supérieur (BTS)
A Level 5 national diploma specializing in technical fields. The curriculum is structured in "blocs de compétences" (competency blocks), allowing for modular validation.
BTS Électrotechnique - Compétency Block
RNCP41007BC01
Étude et conception préliminaire d'une installation
(Preliminary study and design of an installation)
South African Qualifications Authority (SAQA)
National Qualifications Framework (NQF)
Defines national standards for qualifications and facilitates the articulation and portability of credits across institutions and workplaces.
NQF Unit Standard Example
Qualification | National Certificate: Electrical Engineering (ID 72071)
Unit Standard ID | 259037
Title | Design and install electrical wire ways
Level | NQF Level 3
Credits | 8
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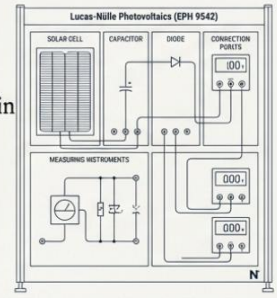
Pillar 2: Applied Technical Skills

From Didactic Theory to Real-World Diagnostics

German Didactic Systems (Lucas-Nülle)

Leveraging the UniTrain and InsTrain modular learning systems for hands-on experimentation in electronics, automation, and renewable energy. The system includes guided fault simulation and real-time diagnostics.



Indian Vocational Training (ITI)

Incorporating the National Instructional Media Institute (NIMI) curriculum for Electrician Trade (NSQF Level 5), which emphasizes structured practical exercises in wiring, soldering, and workshop safety.

NIMI Curriculum: Electrician (NSQF Level 5)	
Module No.:	3
Module Title:	Wires, Joints - Soldering - U.G. Cables
Allocated Time:	125 Hrs

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Pillar 3: Digital & Professional Competencies

Mastering the Tools of the Contemporary Digital Economy

Enterprise Cloud Platforms

Structured learning through Salesforce Career Pathways, developing specialized skills in areas like **Salesforce Technical Architect**, covering System Architecture, API Integration, and ETL.

Advanced Computing Paradigms

Deep knowledge in **Cloud Computing & Big Data**, including Hadoop and Spark. Expertise in **Spatial Computing**, covering GIS applications in telecommunications for network optimization and location-based services.

Digital Credentialing

Utilizing modern platforms for verifiable digital credentials, including **BlockMark Technologies** for issuing blockchain-stamped certificates and **Cyber Essentials** for security validation.

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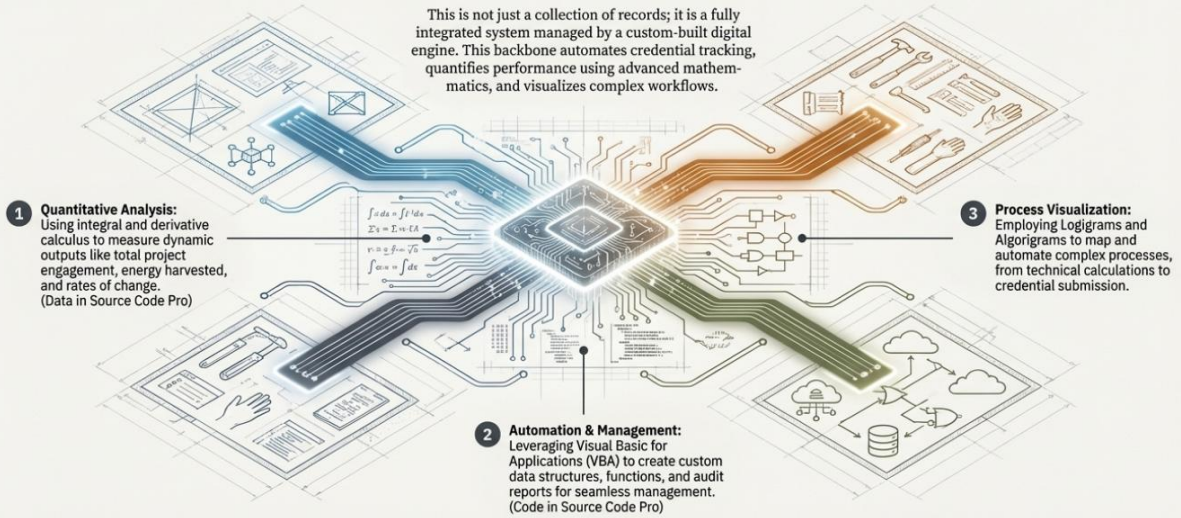
Pillar 4: The Unifying Digital Backbone

The Intelligent Connective Tissue: Code, Calculus, and Logic


This is not just a collection of records; it is a fully integrated system managed by a custom-built digital engine. This backbone automates credential tracking, quantifies performance using advanced mathematics, and visualizes complex workflows.
1 Quantitative Analysis: Using integral and derivative calculus to measure dynamic outputs like total project engagement, energy harvested, and rates of change. (Data in Source Code Pro)
2 Automation & Management: Leveraging Visual Basic for Applications (VBA) to create custom data structures, functions, and audit reports for seamless management. (Code in Source Code Pro)
3 Process Visualization: Employing Logigrams and Algorigrams to map and automate complex processes, from technical calculations to credential submission.

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The Engine's Logic: Quantifying Performance with Code and Calculus

Credential & Calculation Tracking

```
' Module: CredentialDashboard
Type CalculationRecord
    DateStamp As Date
    Topic As String
    MethodUsed As String
    SimulationTool As String
    ResultSummary As String
    Award As String
    RewardPoints As Integer
End Type

Function WindEnergyHarvest(rho As Double, A As Double, v As
     Double, eta As Double, duration As Double) As Double
    WindEnergyHarvest = 0.5 * rho * A * (v ^ 3) * eta * duration
End Function
```

A Quantitative Approach

Total Engagement Over Time:

$$E_{\text{total}} = \int_0^T E(t)\,dt$$

Total Energy Harvested (Wind):

$$E = \int_0^T \frac{1}{2}\rho A v^3 \eta\,dt$$

Rate of Task Completion:

$$\frac{dN}{dt}$$

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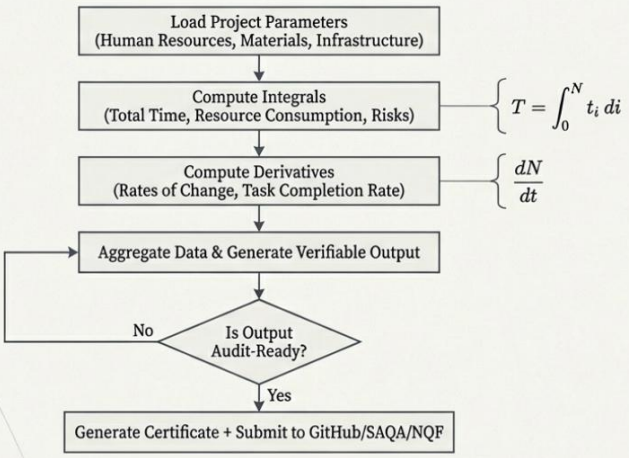
Visualizing the Workflow: An Automated, End-to-End Process



This automated workflow ensures every credential is the product of a traceable, data-driven, and verifiable process.

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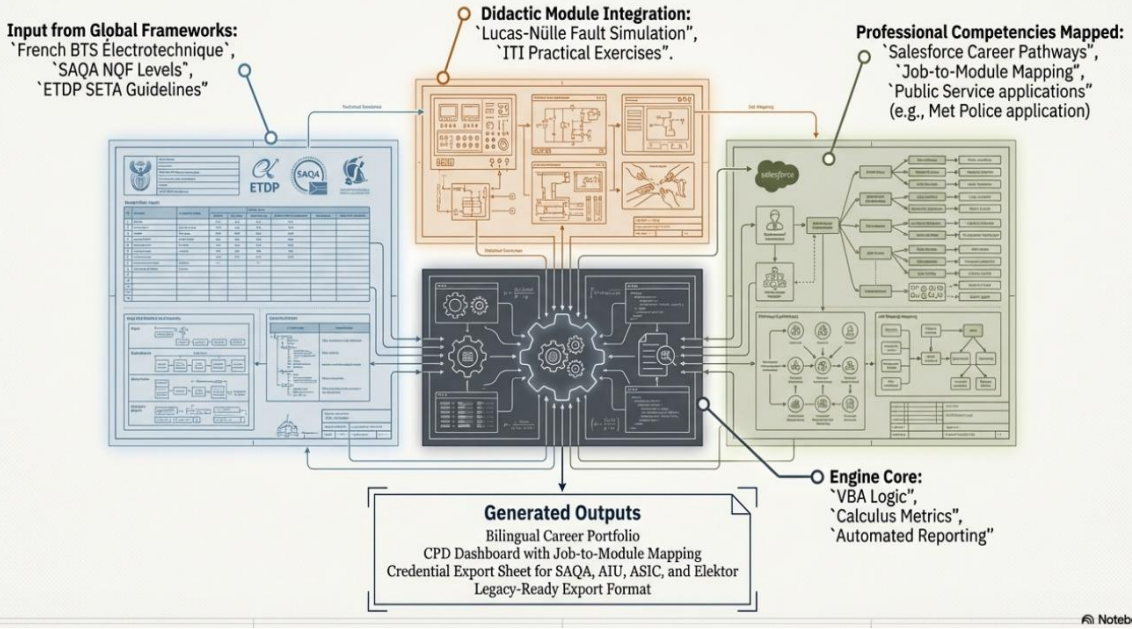
The Complete Blueprint: A Synthesized Career Dashboard



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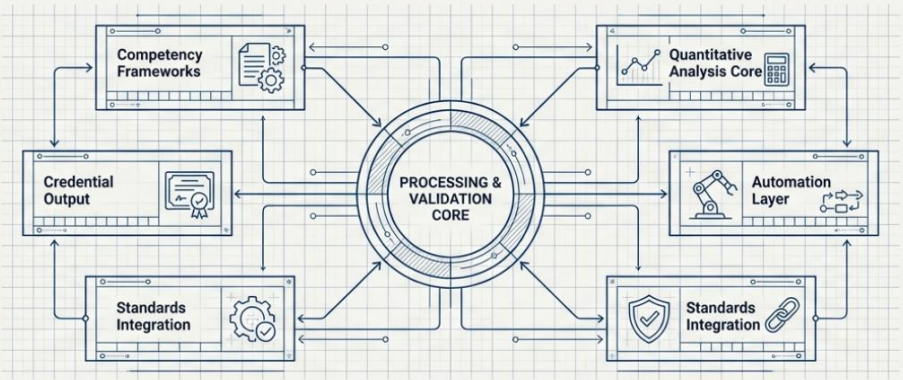
The Architecture of a Career: An Integrated Credentialing Engine

A modular, automated system for audit-grade skill validation and professional development across complex global domains.



This format supports audit-grade tracking across engineering, education, energy, and public service domains.

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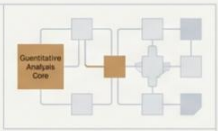
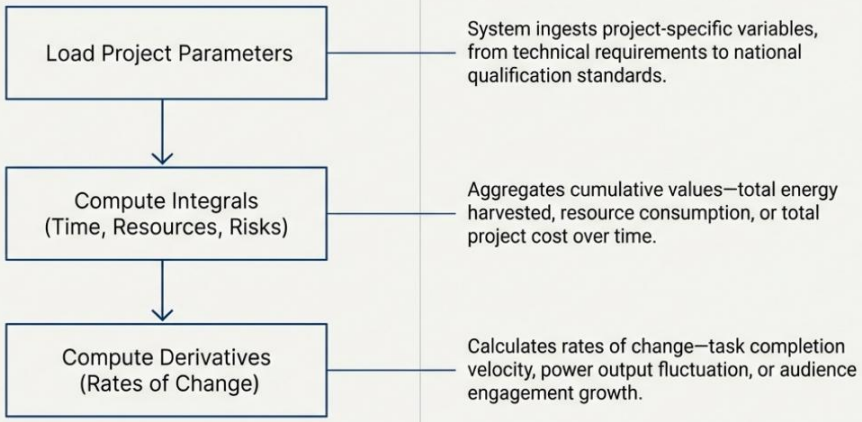
The Core Logic: A Modular Calculation Flow




Load Project Parameters
System ingests project-specific variables, from technical requirements to national qualification standards.
Compute Integrals (Time, Resources, Risks)
Aggregates cumulative values—total energy harvested, resource consumption, or total project cost over time.
Compute Derivatives (Rates of Change)
Calculates rates of change—task completion velocity, power output fluctuation, or audience engagement growth.

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Module 1: Deconstructing Expertise into Verifiable Competency Blocks

Supply Chain Management: Masters in Supply Chain Management and Traceability

Focusing on the integration of software engineering principles with supply chain management writing supply chain management... design and implementation of traceability systems.

Spatial Computing in Telecommunications

Utilizing spatial data to design more efficient and reliable telecommunications networks, entieming the reliable telecommunications networks... applying spatial analysis to optimize the allocation of network resources.

- Spatial Data
- GIS in Telecom
- 5G and Spatial Computing

Genetic Engineering and Manufacturing

Explores the manufacturing techniques specific to biopharmaceuticals, excolories the nate-and cipating challenges and strategies involved... challenges and strategies involved in scaling genetic engineering products from laboratory to market.

- Fermentation Technology
- Scale-Up and Commercialization
- Quality Control

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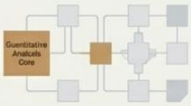
Module 2: Applying Consistent Quantitative Analysis Across Domains



Renewable Energy

Total Power Output:

$$P_{\text{total}} = \int_0^T P(t)\,dt$$

Calculates total energy harvested by integrating power output over a specific time period.

Project Management

Total Cost Estimate:

$$C_{\text{total}} = \sum (M_{\text{material}} + H_{\text{human}} + \\ + S_{\text{stationery}} + B_{\text{building}})$$

Aggregates cost projections across all resource categories for a complete financial overview.

Social Media Marketing

Total Engagement:

$$E_{\text{total}} = \int_0^T E(t)\,dt$$

Measures cumulative audience engagement by integrating the rate of interaction over the campaign duration.

Telecommunications

Doppler Shift Compensation:

$$f_{\text{d}} = \frac{v}{c} f_s$$

Applies precise physics-based calculations to manage signal frequency in mobile communication networks.

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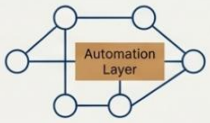
Module 3: The Automation Layer - Structuring Data for Audit and Export



Visual Basic Logic Snippet (Credential Tracker)

```
Type CalculationRecord
    DateStamp As Date
    Topic As String
    MethodUsed As String
    OptimizationType As String
    SimulationTool As String
    ResultSummary As String
    Award As String
    RewardPoints As Integer
    Notes As String
End Type
```

Visual Basic Logic Snippet (Social Media Dashboard)

```
Type MarketingRecord
    DateStamp As Date
    Platform As String
    CampaignName As String
    ContentType As String
    EngagementRate As Double
    ...
    CredentialLinked As Boolean
End Type
```

The system uses strongly-typed data structures in Visual Basic to ensure every record is complete, consistent, and ready for automated processing, credential linking, and export to external verification bodies.

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Case Study: An Integrated View of a Bilingual Engineering Project

Quantitative Analysis Core — Automation Layer

Project Dashboard

Metric 1: Total Time:

$$T = \int_0^N t_i \, di$$

(Total project time across N tasks)

Metric 2: Task Completion Rate:

$$\frac{dN}{dt}$$

(Rate of task completion over time)

Metric 3. Human & Material Resources:

$$R = \int_0^T r(t) \, dt$$

(Total resource consumption)

Sourced from Automated Cost Estimator

- Human Resource / Ressources humaines : $ [Currency Value]
- Material / Matériel : $ [Currency Value] Value]
- Stationery / Fournitures : $ [Currency Value]
- Building / Infrastructure : $ [Currency Value]
- Total Cost / Coût total : $ [Currency Value]

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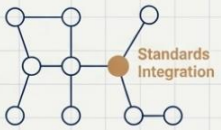
Module 4: Mapping Internal Competencies to Global Standards



South Africa

SAQA

System aligns with the NQF, mapping skills to specific Unit Standards.

Example: **SAQA ID 67491: National Certificate: N3 Engineering Studies,** which includes core components in Electrical Trade Theory, Engineering Science, and Mathematics.

France

Outputs are structured to meet the requirements of French national diplomas.
Example: **Brevet de Technicien Supérieur (BTS) Électrotechnique**, validating competencies in design, maintenance, and project management for smart electrical installations.

India

Curriculum modules are compatible with NSQF standards.

Example: **Electrician Trade Theory NSQF Level - 5**, covering Safety, Basic Workshop Practice, and AC/DC Circuits as part of a 525-hour practical curriculum.

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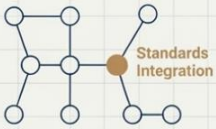
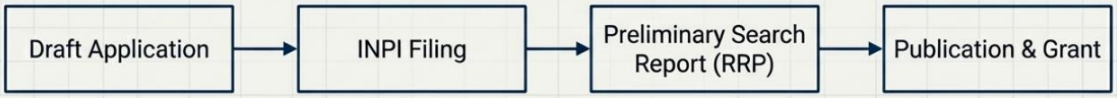
Deep Dive: Processing a French Patent of Invention (Brevet d'invention)



"Le brevet protège une innovation technique, c'est-à-dire un produit ou un procédé qui apporte une nouvelle solution technique à un problème technique donné."

1. Novelty (Nouveauté): Must not be publicly disclosed before filing. The system includes a check for prior art search using databases like Espacenet.
2. Inventive Step (Apport inventif): Must not be obvious to a "person skilled in the art." The system logs the technical problem and the proposed inventive solution.
3. Industrial Application (Application industrielle): Must be functional and useful. The system requires documentation of the technical function.



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Deep Dive: Navigating the South African NQF for Electrical Engineering

SAQA ID 72071: National Certificate: Electrical Engineering: Mining (NQF Level 3)

Total Credits Required: 133

- Component 1: Core (83 Credits)
  - Unit Standard 258963: Install, test and maintain low-voltage electrical equipment.
  - Unit Standard 258976: Troubleshoot and repair electrical control systems.
- Component 2: Fundamental (36 Credits)
  - Unit Standard 119472: Accommodate audience and context needs in oral/signed communication.
  - Unit Standard 9010: Demonstrate an understanding of the use of science and technology.
- Component 3: Elective (Minimum 14 Credits)
  - Unit Standard 259097: Carry out a detailed inspection and repair defects on explosion prevention apparatus.

The engine automates credit tracking, ensuring all Core, Fundamental, and Elective requirements are met for final qualification.

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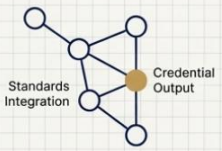
Module 5: Generating Secure, Portable, and Verifiable Credentials



Step 1: Data Aggregation

The engine compiles all validated data points: performance metrics, completed curriculum blocks, and adherence to standards.

Step 2: Credential Generation

Creates a credential export sheet compatible with multiple international bodies.

SAQA AIU ASIC Elektor

Step 3: Secure Issuance

Leverages modern platforms for audit-grade issuance.

BlockMark Technologies from:
- "Issue a certificate with an expiry date: £1 (100) per year"
- "Stamp a hash of an issued certificate on blockchain: £1 (100)"
- "Create (mint) a NFT digital twin for a certified thing: £1 (100)"

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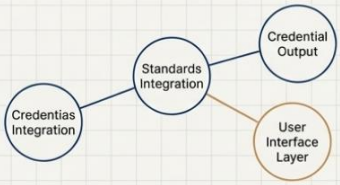
Module 6: The Interface Layer - Dashboards, Career Planning, and Applications



Career Development Planning:

The engine powers personalized learning plans. Users can map their skills, identify gaps, and select modules from Trailhead or internal curricula to achieve their goals (e.g., Salesforce Developer, Technical Architect).

Hiring and Promotion:

The system provides a back-end for tracking candidate eligibility and application progress, ensuring all criteria (probation status, security checks, qualifications) are met and verified.

Evidence Locker:

All achievements, from micro-credentials to formal certifications, are logged and linked, creating a comprehensive and verifiable record of a user's capabilities.

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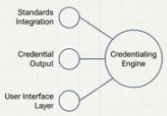
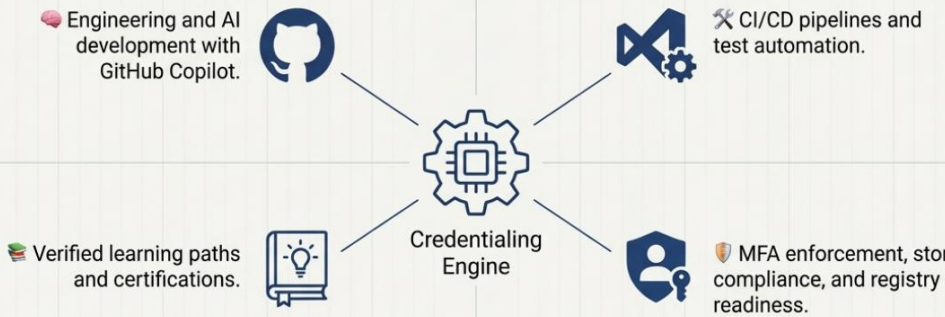
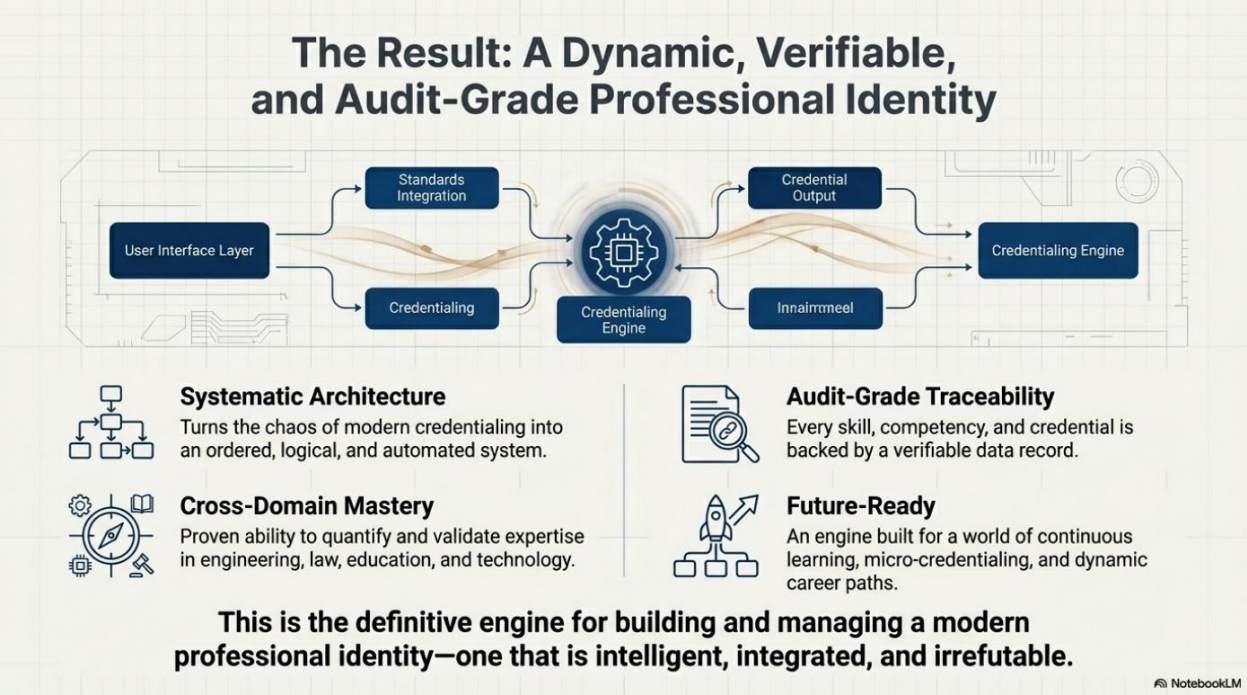
The System in Practice: A Fully Integrated Microsoft Career Engine




🧠 Engineering and AI development with GitHub Copilot.
🛠️ CI/CD pipelines and test automation.
Credentialing Engine
📚 Verified learning paths and certifications.
🛡️ MFA enforcement, storage compliance, and registry readiness.

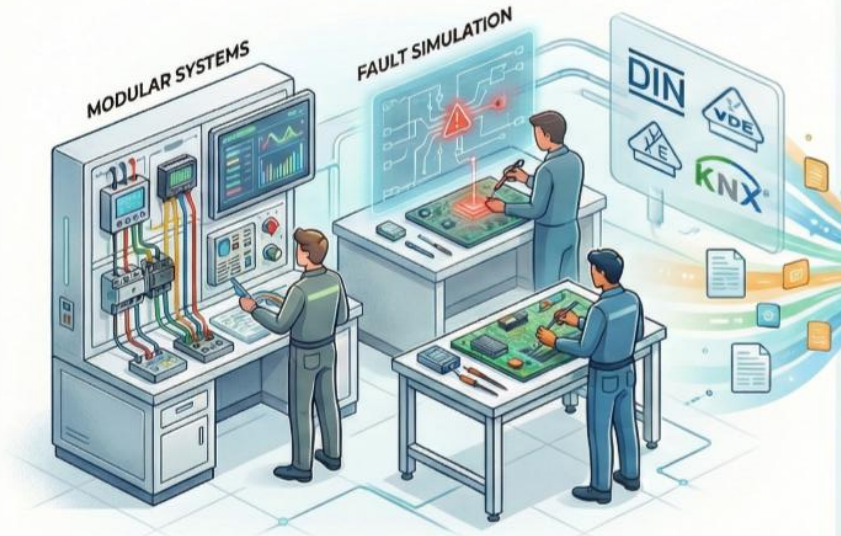
The modular foundation supports a cohesive ecosystem where code contributions in GitHub, pipeline deployments in Azure, and certifications from Microsoft Learn are automatically tracked, validated, and credentialed, creating a single source of truth for technical proficiency.

NotebookLM


The Result: A Dynamic, Verifiable, and Audit-Grade Professional Identity
User Interface Layer
Standards Integration
Credentialing
Credentialing Engine
Credential Output
Innairrmeel
Credentialing Engine
Systematic Architecture
Turns the chaos of modern credentialing into an ordered, logical, and automated system.
Audit-Grade Traceability
Every skill, competency, and credential is backed by a verifiable data record.
Cross-Domain Mastery
Proven ability to quantify and validate expertise in engineering, law, education, and technology.
Future-Ready
An engine built for a world of continuous learning, micro-credentialing, and dynamic career paths.
This is the definitive engine for building and managing a modern professional identity—one that is intelligent, integrated, and irrefutable.
NotebookLM

Bridging the Gap: A System for Verifiable Technical Skills

THE FOUNDATION: MODULAR, HANDS-ON TRAINING



Training is Built on Modular, Project-Based Systems

Learners build real-world skills using didactic panels for electrical, automation, and safety tasks.

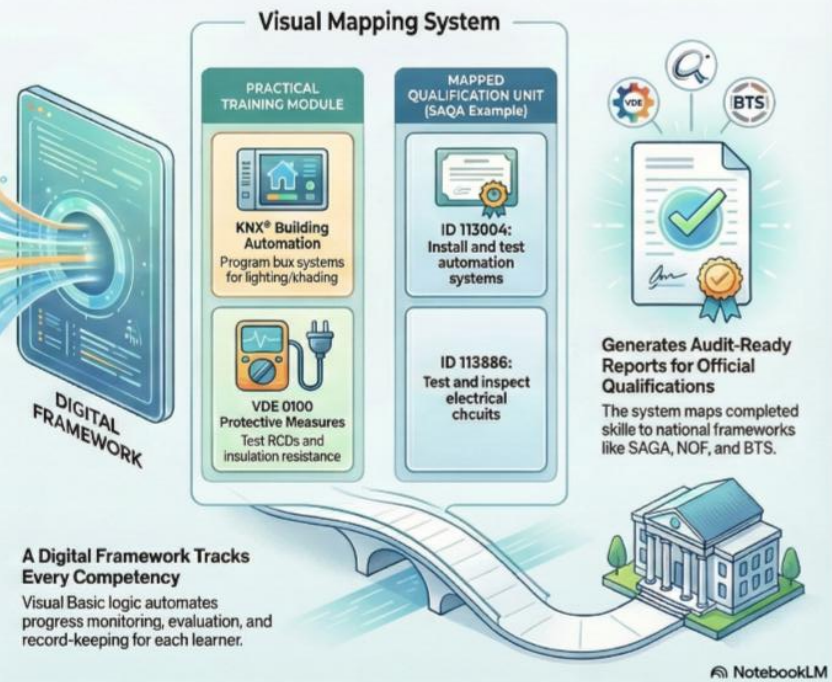
Integrated Fault Simulation Tests Diagnostic Skills

Systems include built-in error simulators to test troubleshooting and safety protocol compliance.

Aligned with Industry Standards

Exercises and assessments are based on real-world safety and technical regulations.

THE BRIDGE: DIGITAL TRACKING & CERTIFICATION


DIGITAL FRAMEWORK
Visual Mapping System
PRACTICAL TRAINING MODULE
MAPPED QUALIFICATION UNIT (SAQA Example)
KNX® Building Automation
Program bux systems for lighting/khading
VDE 0100 Protective Measures
Test RCDs and insulation resistance
ID 113004: Install and test automation systems
ID 113886: Test and inspect electrical chcuits
BTS

A Digital Framework Tracks Every Competency

Visual Basic logic automates progress monitoring, evaluation, and record-keeping for each learner.

Generates Audit-Ready Reports for Official Qualifications

The system maps completed skille to national frameworks like SAGA, NOF, and BTS.

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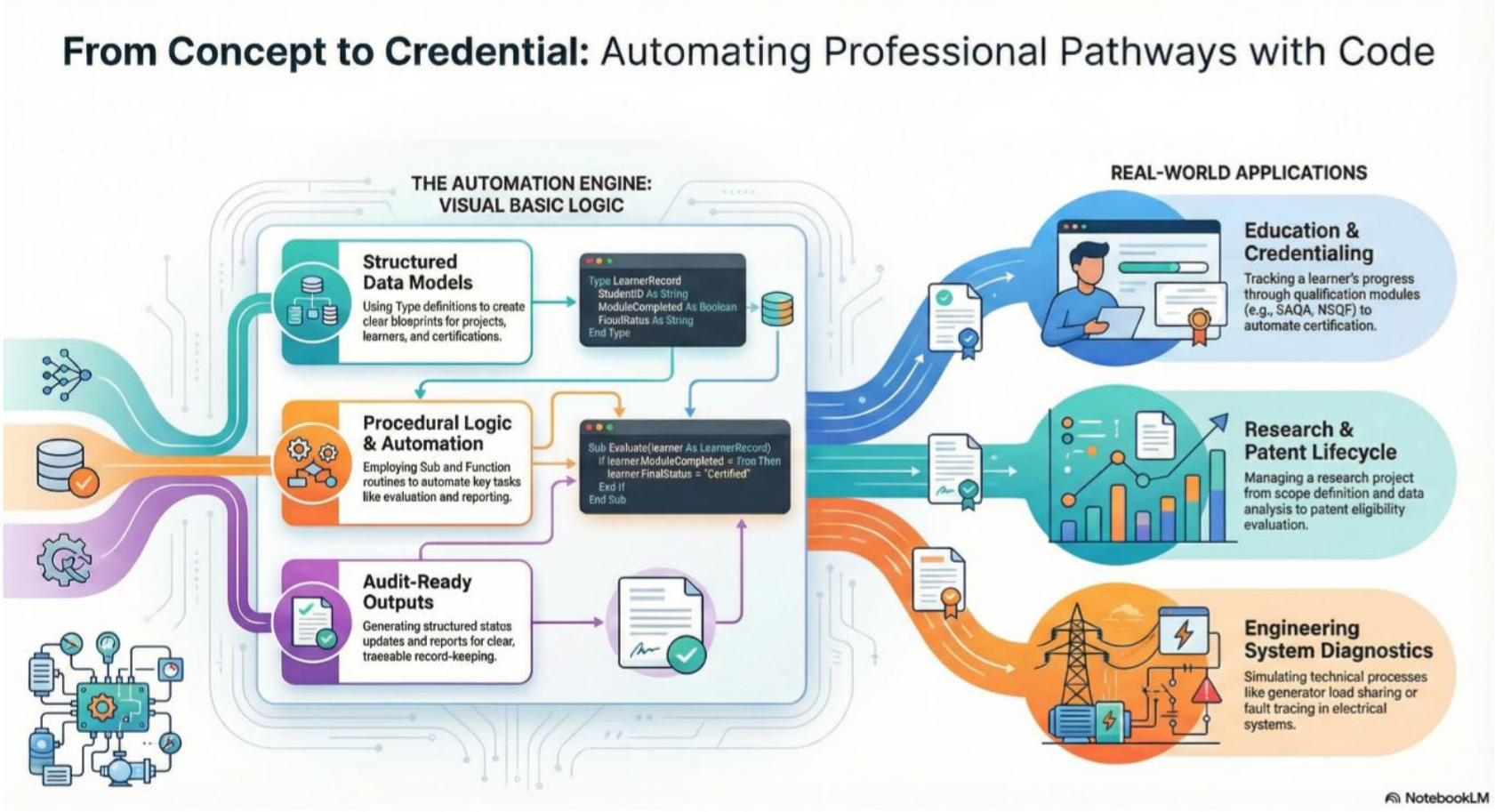
From Concept to Credential: Automating Professional Pathways with Code
THE AUTOMATION ENGINE: VISUAL BASIC LOGIC
Structured Data Models
Using Type definitions to create clear blueprints for projects, learners, and certifications.
Type LearnerRecord
StudentID As String
ModuleCompleted As Boolean
FinalStatus As String
End Type
Procedural Logic & Automation
Employing Sub and Function routines to automate key tasks like evaluation and reporting.
Sub Evaluate(learner As LearnerRecord)
If learner.ModuleCompleted = True Then
learner.FinalStatus = "Certified"
End If
End Sub
Audit-Ready Outputs
Generating structured status updates and reports for clear, traceable record-keeping.
REAL-WORLD APPLICATIONS
Education & Credentialing
Tracking a learner's progress through qualification modules (e.g., SAQA, NSQF) to automate certification.
Research & Patent Lifecycle
Managing a research project from scope definition and data analysis to patent eligibility evaluation.
Engineering System Diagnostics
Simulating technical processes like generator load sharing or fault tracing in electrical systems.
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Automating Achievement: Tracking Credentials & Compliance with Visual Basic

Visual Basic modules transform complex multi-step procedures into structured, automated, and auditable tracking systems for learners, professionals, projects, and compliance.

TRACKING THE LEARNER & PROFESSIONAL JOURNEY

Mapping National Qualifications

Code structures national curricula (like NSQF) into modules and certifies individual competencies.

Certifying Hands-On Skills

This system tracks practical training progress, including fault resolution and module completion.

Automating Academic Promotion

Logic calculates a final promotion mark based on coursework (ICASS) and exam scores.

MANAGING PROJECT & COMPLIANCE LIFECYCLES

Managing the Innovation Pipeline

A system tracks the entire research project lifecycle, from scope definition to patent filing.

Streamlining Institutional Compliance

Manages complex applications to government bodies (DHET) for new curriculum offerings.

Ensuring Safety & Auditability

This code logs results from standardized electrical safety tests for compliance records.

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The Tshitadi Dossier

A Case for Recognition Through Innovation

A Profile of Tshingombe Tshitadi Fiston

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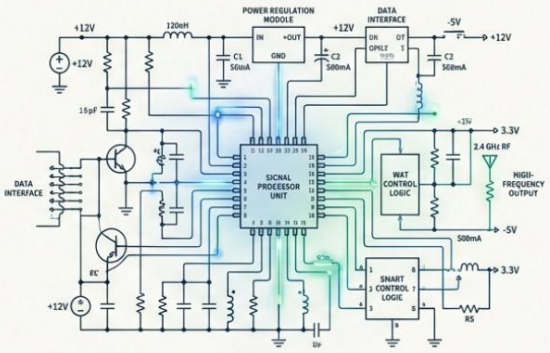
A Paradox of Prolific Work and Systemic Hurdles



This dossier chronicles the extensive work of Tshingombe Tshitadi Fiston, an engineer and educator whose journey reveals a critical disconnect. While formal systems presented barriers and rejections, a substantial body of innovative work in electrical engineering, curriculum design, and applied research was consistently produced. This is the evidence of that work.

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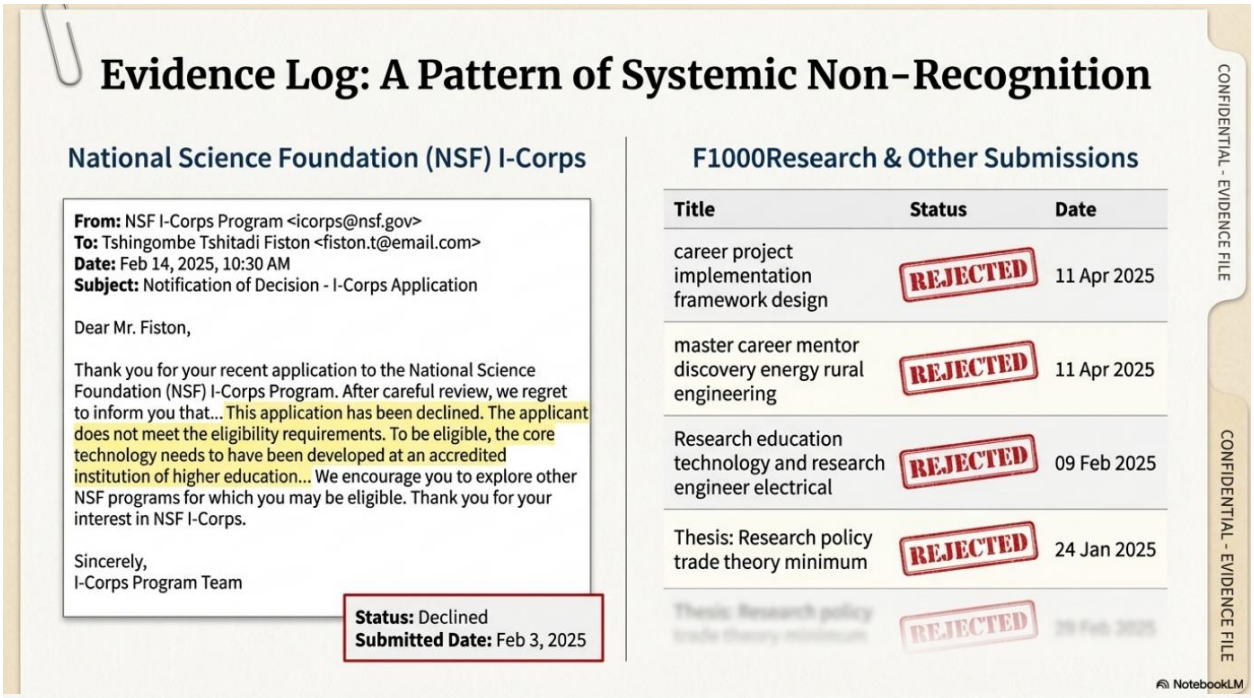
Evidence Log: A Pattern of Systemic Non-Recognition
National Science Foundation (NSF) I-Corps
From: NSF I-Corps Program <icorps@nsf.gov>
To: Tshingombe Tshitadi Fiston <fiston.t@email.com>
Date: Feb 14, 2025, 10:30 AM
Subject: Notification of Decision - I-Corps Application
Dear Mr. Fiston,
Thank you for your recent application to the National Science Foundation (NSF) I-Corps Program. After careful review, we regret to inform you that... This application has been declined. The applicant does not meet the eligibility requirements. To be eligible, the core technology needs to have been developed at an accredited institution of higher education... We encourage you to explore other NSF programs for which you may be eligible. Thank you for your interest in NSF I-Corps.
Sincerely,
I-Corps Program Team
Status: Declined
Submitted Date: Feb 3, 2025
F1000Research & Other Submissions
Title
Status
Date
career project implementation framework design
REJECTED
11 Apr 2025
master career mentor discovery energy rural engineering
REJECTED
11 Apr 2025
Research education technology and research engineer electrical
REJECTED
09 Feb 2025
Thesis: Research policy trade theory minimum
REJECTED
24 Jan 2025
REJECTED
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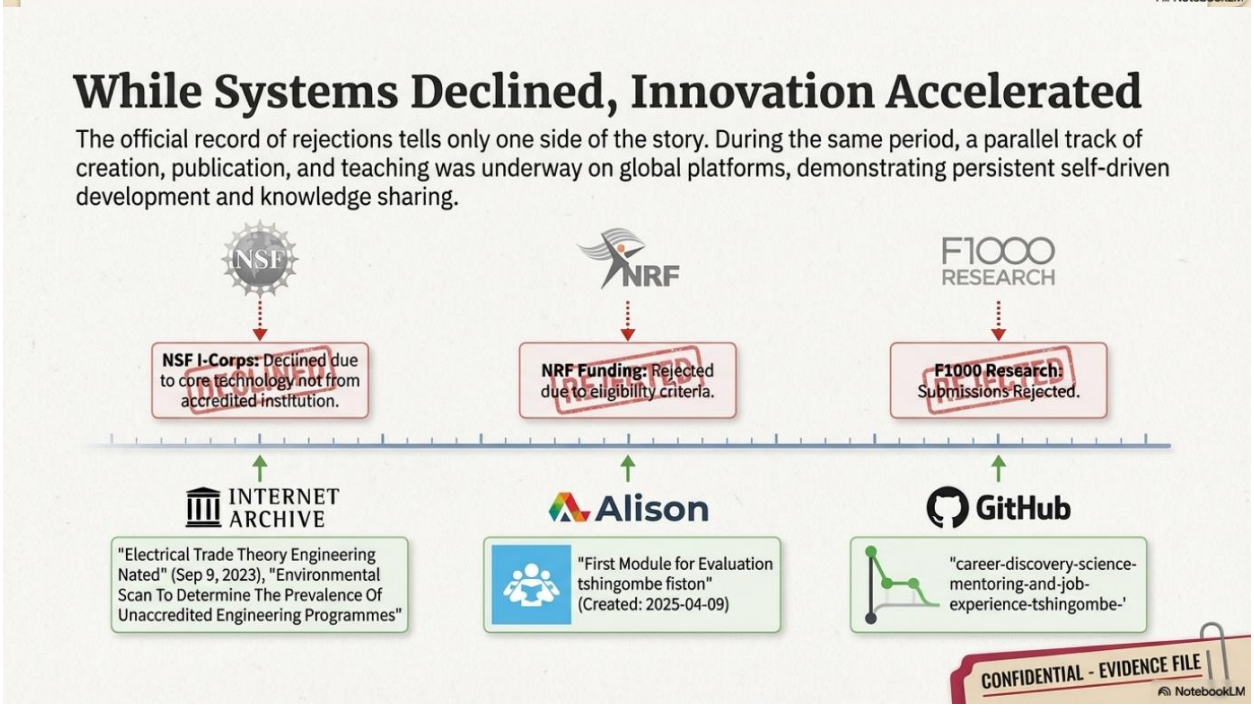
While Systems Declined, Innovation Accelerated
The official record of rejections tells only one side of the story. During the same period, a parallel track of creation, publication, and teaching was underway on global platforms, demonstrating persistent self-driven development and knowledge sharing.
NSF
NRF
F1000 RESEARCH
NSF I-Corps: Declined due to core technology not from accredited institution.
NRF Funding: Rejected due to eligibility criteria.
F1000 Research: Submissions Rejected.
INTERNET ARCHIVE
"Electrical Trade Theory Engineering Nated" (Sep 9, 2023), "Environmental Scan To Determine The Prevalence Of Unaccredited Engineering Programmes"
Alison
"First Module for Evaluation tshingombe fiston" (Created: 2025-04-09)
GitHub
"career-discovery-science-mentoring-and-job-experience-tshingombe-'
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Exhibit A: A Portfolio of Advanced Electrical Engineering Research

The work spans multiple domains of modern electrical engineering, from grid modernization and AI-driven maintenance to advanced power systems. The research proposals and projects demonstrate a deep engagement with current industry challenges.

1. Smart Grid & Rural Energy

- Cost-benefit analysis of microgrids in remote areas
- Optimization of battery energy storage for grid stabilization
- artificial intelligence system rural development system residential

2. Control Systems & Automation

- AI-Based Predictive Maintenance in Industrial Systems
- Machine learning for fault detection in power transformers

3. Wireless Power & Electromagnetics

- Developing high-efficiency resonant inductive coupling systems
- Applications of wireless power transfer in electric vehicles

4. Power Systems Analysis

- Kirchoff's fault low
- cyclo convertiseur
- thermoet effect
- synchronous generators
- induction motor torque-speed characteristics

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Exhibit B: Architecting the Next Generation of Technical Education

A core component of the portfolio is the systematic design of technical and vocational education and training (TVET) curricula. This work combines practical, hands-on learning with modern pedagogical theory and learning management system (LMS) integration.

Curriculum Design

Curriculum for the Basic Equipment Maintenance Technical Training Course

Duration	Subject	Elements
3 days	nut, bolt	basic connect nut bolt
3 days	shaft and bearing	fitting shaft
3 days	Sealing method	importance and basic techniques

Instructional Design

Practice on Various Logics Using Logic Gates and Circuits

Learning Objectives:

- Construct and verify OR, AND, and NOT gates using switches, lamps, and ICs
- Understand and apply truth tables for basic logic gates

Frameworks & Integration

Pedagogical Frameworks

Experiential learning, apprenticeship, ADDIE model, Technology Acceptance Model (TAM), Outcome-based education.

LMS Integration

Blackboard schoology Google Classroom

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Exhibit C: A Commitment to Lifelong Learning on Global Platforms

In the absence of traditional academic pathways, learning and certification were pursued through leading global education platforms. This demonstrates a proactive approach to skill acquisition and mastery in high-demand areas like data science and AI.

Alison

Verified Skill Acquisition on Alison

Key Achievements

- Diploma in electrical studies — 12%
- ISO 37301:2021 principle of compliance management system ✓ — 91% CERTIFIED
- Advanced diploma of electrical technology and circuit analysis — 3%

Workplace Personality Assessment

Assertiveness: 8/10 | Work Structure: 1/10 | Creative Learning Style: 3/10

Aptitude Test Result

Percentile Rank: You scored better than 6% of global test-takers. This baseline is a strong starting point for growth!

Microsoft Learn

Professional Development in Data & AI

Learning Path Title:
Discover Data Concepts and Implement Solutions with Microsoft Fabric

This plan covers data discovery, classification, and protection, alongside implementing data warehouses using Microsoft Fabric. You'll learn key technologies like Azure and Microsoft Fabric. Inflactation data analytics, and analyzie a WE technologies details you to technology for data cheries on datasragots and Mcrosoft…

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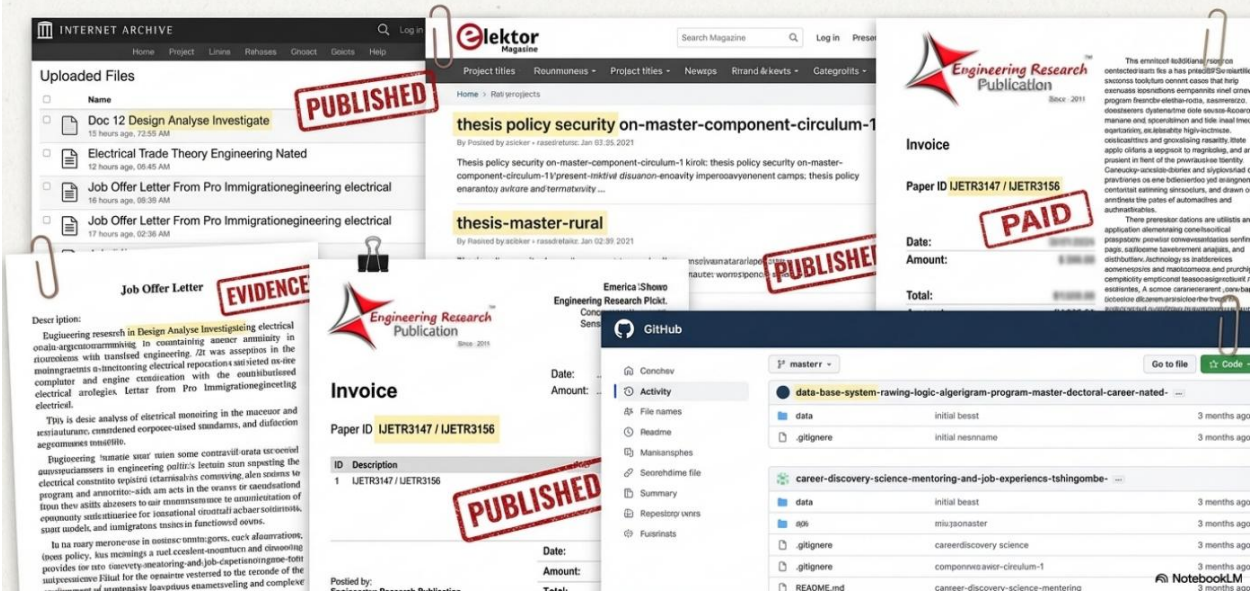
An Archive of Persistent Intellectual Output



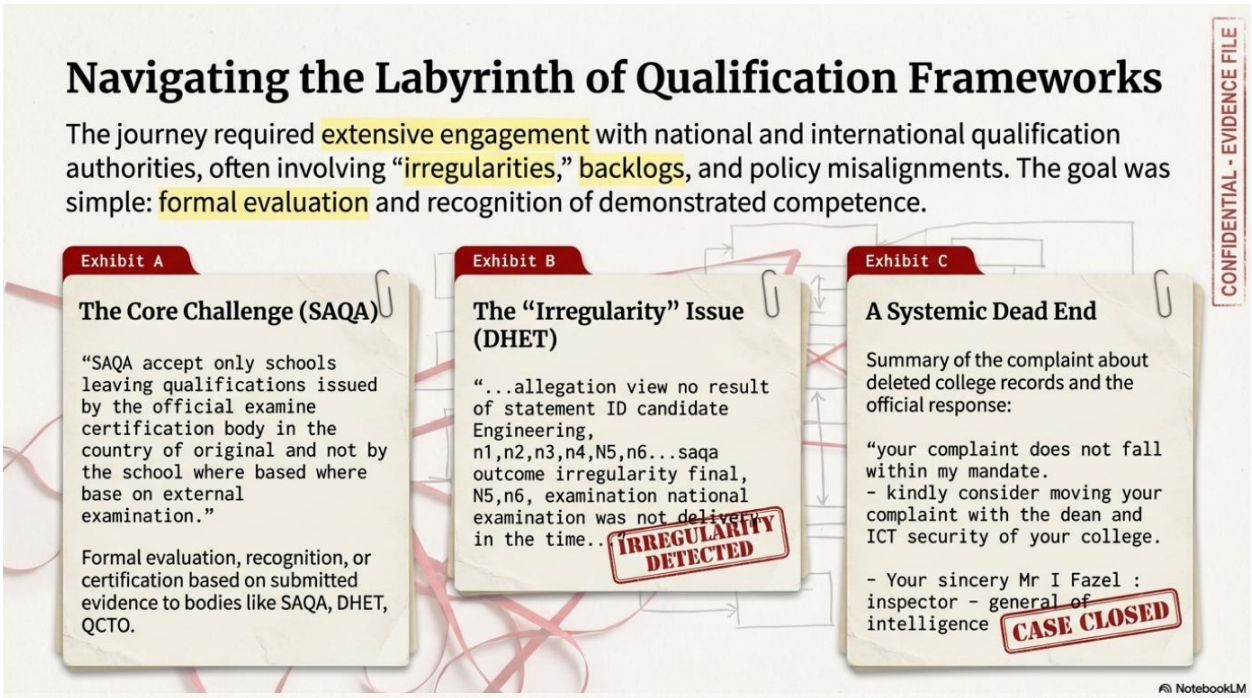

Navigating the Labyrinth of Qualification Frameworks
The journey required extensive engagement with national and international qualification authorities, often involving "irregularities," backlogs, and policy misalignments. The goal was simple: formal evaluation and recognition of demonstrated competence.
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Exhibit A
The Core Challenge (SAQA)
"SAQA accept only schools leaving qualifications issued by the official examine certification body in the country of original and not by the school where based where base on external examination."
Formal evaluation, recognition, or certification based on submitted evidence to bodies like SAQA, DHET, QCTO.
Exhibit B
The "Irregularity" Issue (DHET)
"...allegation view no result of statement ID candidate Engineering, n1,n2,n3,n4,N5,n6...saqa outcome irregularity final, N5,n6, examination national examination was not delivery in the time..."
IRREGULARITY DETECTED
Exhibit C
A Systemic Dead End
Summary of the complaint about deleted college records and the official response:
"your complaint does not fall within my mandate.
- kindly consider moving your complaint with the dean and ICT security of your college.
- Your sincery Mr I Fazel : inspector - general of intelligence
CASE CLOSED
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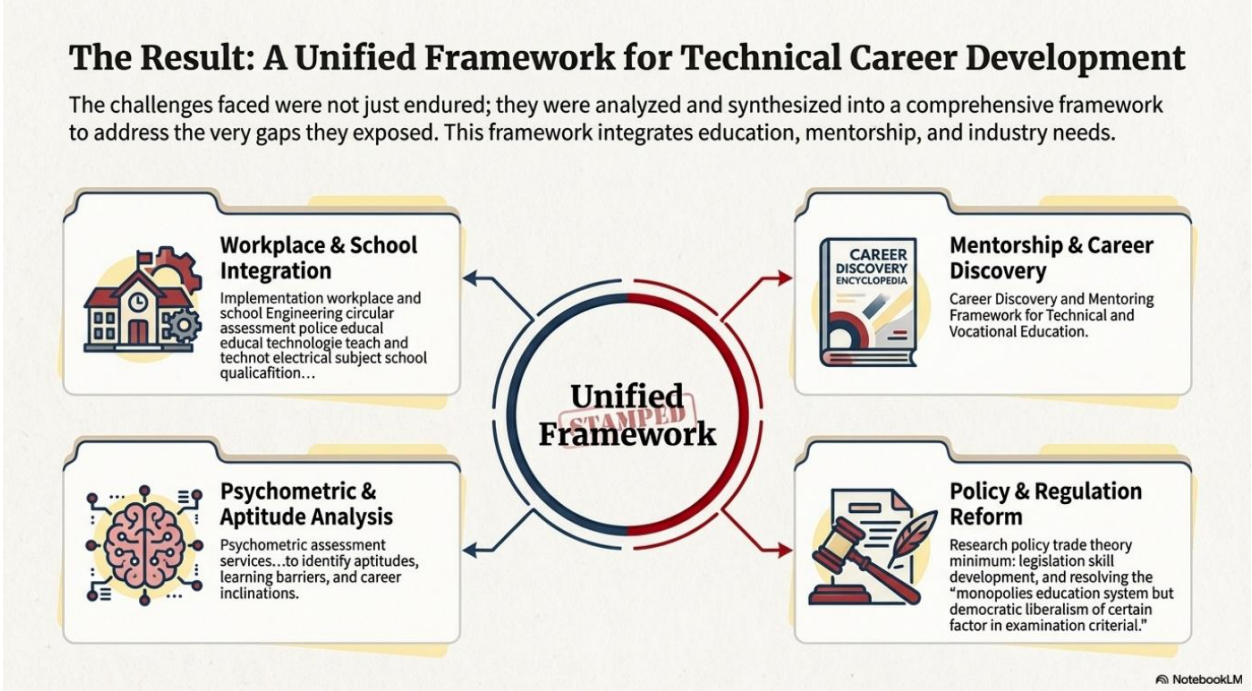
The Result: A Unified Framework for Technical Career Development
The challenges faced were not just endured; they were analyzed and synthesized into a comprehensive framework to address the very gaps they exposed. This framework integrates education, mentorship, and industry needs.
Workplace & School Integration
Implementation workplace and school Engineering circular assessment police educal educal technologie teach and technot electrical subject school qualicafition...
Unified Framework
STAMPED
Mentorship & Career Discovery
CAREER DISCOVERY ENCYCLOPEDIA
Career Discovery and Mentoring Framework for Technical and Vocational Education.
Psychometric & Aptitude Analysis
Psychometric assessment services...to identify aptitudes, learning barriers, and career inclinations.
Policy & Regulation Reform
Research policy trade theory minimum: legislation skill development, and resolving the "monopolies education system but democratic liberalism of certain factor in examination criterial."
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The Case for a New Model of Expertise

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- The evidence demonstrates a sustained, high-level output of technical and pedagogical work against significant systemic friction.
- This journey has forged a unique, multi-disciplinary expertise that integrates core engineering, curriculum design, and a deep understanding of global qualification systems.
- The challenge is no longer one of validation, but of recognition and engagement. The work stands on its own merit.

Engage the expertise. Recognize the innovation.

Name: Tshingombe Tshitadi Fiston

Email: tshingombefiston@gmail.com

Website: htww.tshingimbefiston.com

Profile: archive.org/details/@rdferz m

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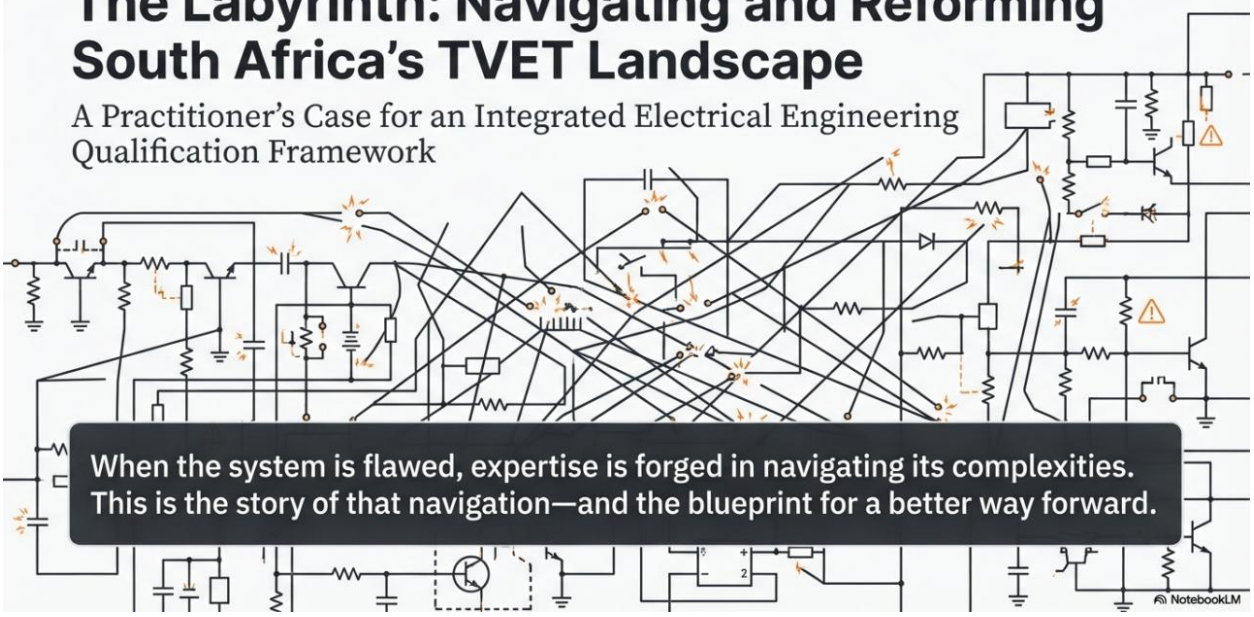
The Labyrinth: Navigating and Reforming South Africa's TVET Landscape

A Practitioner's Case for an Integrated Electrical Engineering Qualification Framework



When the system is flawed, expertise is forged in navigating its complexities. This is the story of that navigation—and the blueprint for a better way forward.

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A System Marked by Friction and Delay

The Technical and Vocational Education and Training (TVET) system for engineering studies is characterized by characterized by systemic irregularities that create significant barriers for learners and lecturers.

Qualification Irregularities

'**Nated ncv combination irregularity**,' non-accredited qualifications, and challenges in recognizing **foreign qualifications** (SAQA).

Administrative Backlogs

'**Slow to challenge factor learning** and **release resultat printed statement**,' 'marking in progress,' and **extensive delays** in issuing diplomas and certificates from DHET.

Curriculum Misalignment

A gap between **theoretical knowledge** ('trade theory') and **practical, industry-relevant skills** required by employers like Eskom and City Power.

Assessment Inconsistencies

'**Non credible process**,' '**irregularite material script**,' and a lack of standardized, fair assessment policies for **Portfolios of Evidence (PoE)**.

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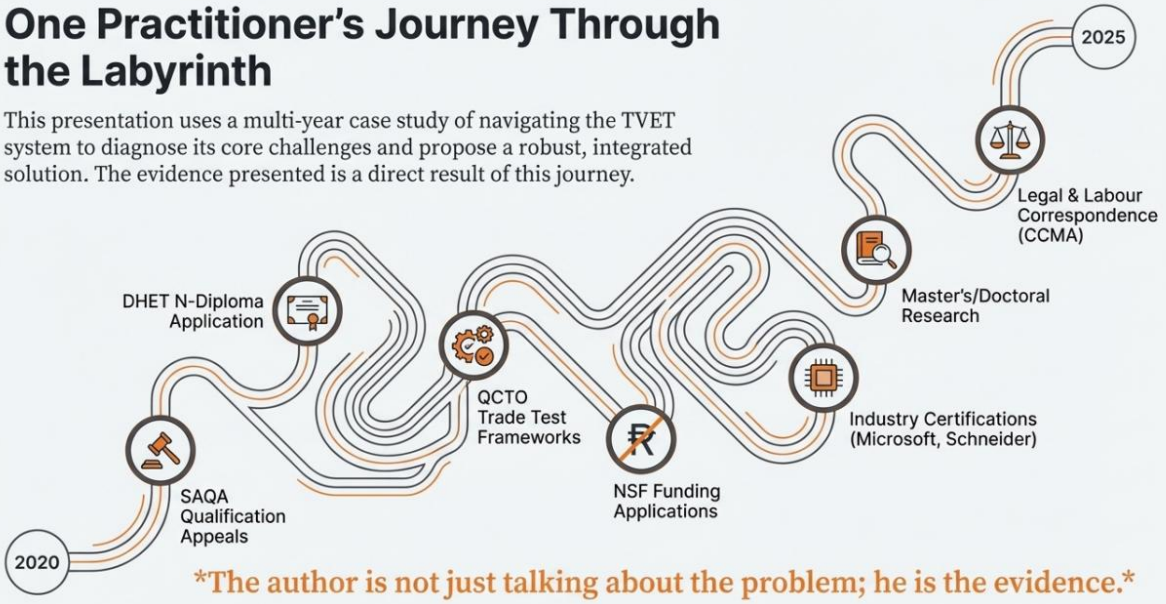
One Practitioner's Journey Through the Labyrinth

This presentation uses a multi-year case study of navigating the TVET system to diagnose its core challenges and propose a robust, integrated solution. The evidence presented is a direct result of this journey.



The author is not just talking about the problem; he is the evidence.

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Exhibit A: The Battle for Qualification Recognition

Appeal to the Department of Higher Education and Training (DHET)

A formal appeal regarding the "release finalized n diplomat studies engineering electrical" due to "irregularity observed." The process involved unresolved issues with examination results, transcripts, and the consolidation of N1-N6 studies with 24 months of required practical experience.

"My request to authority minister for result statement certificate over the date review n diplomat... after examination **irregularite material**... that final result n4 and new re certificate body insurance investigation... was not in my application for diploma."

Engagement with the South African Qualifications Authority (SAQA)

Correspondence with SAQA regarding the evaluation of a foreign qualification ('DR Congo school leavers'). The process was marked by non-compliance issues and requests for resubmission.

"Base the advice below on information current to it saqa reserves the right to change this advice should new authoritative information come to its attention... SAQA accept only schools leaving qualifications issued by the **official examine certification body** in the country of original..."

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Exhibit B: Barriers to Systemic Innovation

From: Ruth Shuman, Program Director, National Science Foundation (NSF)
Subject: NSF I-Corps Program Application
Date: [Date]

Dear Applicant,

Thank you for your submission to the NSF I-Corps Program.

Status: This application has been declined.

Reason: The applicant does not meet the eligibility requirements. To be eligible, the core technology needs to have been developed at an accredited institution of higher education and the proposal must be submitted from an institution of higher education. Companies are not eligible to apply. Furthermore, an application requires a minimum of three team members

Implication

This highlights a critical challenge: practitioners with ground-level insights into systemic flaws **are often locked out** of the very funding channels designed to support educational and technological innovation.

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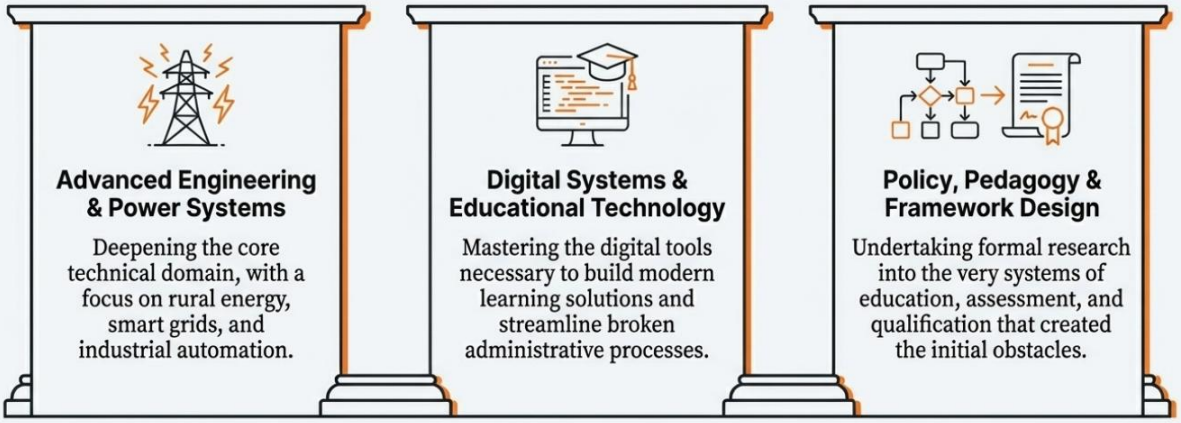
Forging Multidisciplinary Expertise Through Adversity

Navigating the labyrinth of qualifications, funding, and curriculum gaps required the development of a comprehensive skill set far beyond traditional engineering.


Advanced Engineering & Power Systems
Deepening the core technical domain, with a focus on rural energy, smart grids, and industrial automation.
Digital Systems & Educational Technology
Mastering the digital tools necessary to build modern learning solutions and streamline broken administrative processes.
Policy, Pedagogy & Framework Design
Undertaking formal research into the very systems of education, assessment, and qualification that created the initial obstacles.

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Pillar I: Mastery in Advanced Engineering & Power Systems

A portfolio of research and practical projects focused on the critical needs of the modern energy sector.

Power Systems & Rural Energy

"Optimization of Microgrid Systems"

"AI & automation integration in power grid control"

"Stability of power systems" (Case Study: Eskom challenges)

Control Systems & Automation

"AI-Based Predictive Maintenance in Industrial Systems"

"Machine learning for fault detection in power transformers"

"Logic diagram register process electronic key lock timer summer test"

Smart Grid & Wireless Power

"Enhancing demand response strategies using machine learning"

"Developing high-efficiency resonant inductive coupling systems" for EVs.

Industrial Electronics & Safety

"SABS code of practice wiring premise"

"Inspection circuit breaker circuit gear.. inspection transmission insulator"

"Application of induction disc relay"

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Pillar II: Expertise in Digital Systems & Educational Technology

A demonstrated proficiency in the platforms, software, and pedagogical models required to build and manage 21st-century learning ecosystems.

Microsoft Schneider Electric Alison

Cloud & Data Engineering (Microsoft)

- Credentials: `MCID: 99587175`
- Completed Training: "Introduction to Data Engineering on Azure," "Secure data and manage user in azure synapse serverless sal pools," "Azure Test Plans."

Industrial Automation & PLC (Schneider Electric)

- Completed Training: "PLC configuration," "EcoStruxure Power: energy modeling and verification," "Drives fundamentals of kinematic calculation."

Learning Management Systems (LMS) & E-Portfolios

- Research into LMS acceptance factors in TVET institutions.
- Proposed adoption of "e-Portfolio management system" to address documentation and assessment challenges.

Online Pedagogy & Curriculum Design

- Exploration of learning theories: Objectivism, Cognitivism, Connectivism.
- Analysis of online learning models: ADDIE, Online Collaborative Learning (OCL), Competency-Based Learning.

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Pillar III: Specialization in Policy, Pedagogy & Framework Design

Rigorous academic research into the structural issues of the TVET system, culminating in a proposed model for reform.

Qualification Framework Analysis

In-depth study of SAQA, DHET, and QCTO scope in teaching and learning, focusing on the National Qualifications Framework (NQF) and trade testing protocols.

TVET Lecturer Development

Research into a "Performance Management Framework for TVET Lecturers," work-integrated learning (WIL), and experiential learning theory.

Curriculum & Assessment Design

Developing frameworks for "outcome-based design," creating competency and grading criteria, and integrating Portfolios of Evidence (PoE) effectively.

Legal & Regulatory Compliance

Analysis of the Labour Relations Act, sectorial bargaining councils (SETA, sasseta, psira), and the legal framework for qualification appeals and rescission.

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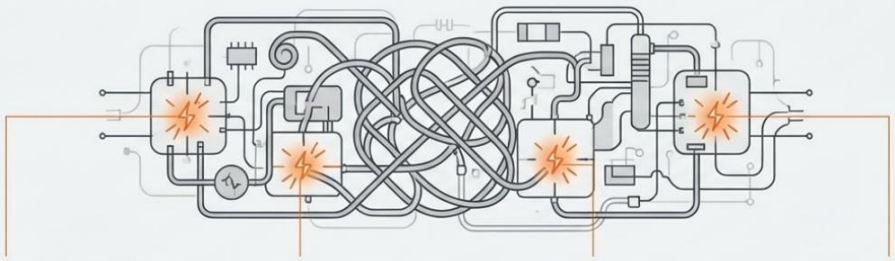
The Diagnosis: Four Critical Failures in the TVET System



Failure 1: The Administrative Deadlock

- **Problem:** Extreme backlogs in processing results, diplomas, and certifications by DHET and SAQA.
- **Impact:** Creates "over stay" students, prevents graduate employability, and damages institutional credibility.

Failure 2: The Siloed Curriculum

- **Problem:** A disconnect between theoretical "trade theory" taught in colleges and the practical, technology-driven needs of modern industry (e.g., City Power, Eskom).
- **Impact:** Graduates lack job-ready skills; lecturers lack current technical knowledge.

Failure 3: The Broken Feedback Loop

- **Problem:** Lack of a formal, continuous feedback mechanism between employers, lecturers, and curriculum developers.
- **Impact:** Qualifications and teaching methods become outdated and irrelevant.

Failure 4: The Unaccredited Void

- **Problem:** Inconsistent accreditation, verification, and recognition of both public and private institutional qualifications.
- **Impact:** Learners invest time and money into qualifications that are not recognized, leading to disputes and legal challenges.

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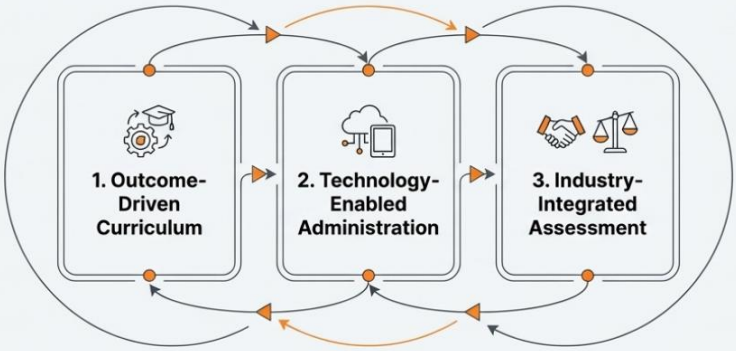
The Blueprint: An Integrated Framework for TVET Engineering Studies

Vision: To create a responsive, technology-enabled TVET ecosystem that seamlessly integrates curriculum, practical experience, and industry needs to produce verifiably competent and employable engineering professionals.



- **Outcome-Oriented:** Success is measured by real-world competency, not just theoretical exams.
- **Industry-Validated:** Curriculum and assessments are co-designed and constantly validated by industry partners.
- **Digitally Integrated:** Leveraging technology (LMS, e-Portfolios, AI) to ensure efficiency, transparency, and data-driven improvement.
- **Holistic Development:** Combining technical skills with soft skills (communication, problem-solving) and professional ethics.

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Component 1: An Outcome-Driven & Industry-Validated Curriculum

Key Initiative 1: Dynamic Curriculum Co-Creation

Action: Establish formal partnerships with industry players (Eskom, City Power, Schneider Electric) and professional bodies (ECSA) to define required competencies.

Mechanism: A 'live' curriculum framework that is reviewed biannually based on technology trends and employer feedback.

Key Initiative 2: A Proposed Model for TVET Lecturer Work-Integrated Learning (WIL)

Action: Implement mandatory, structured industry placements for TVET lecturers to ensure they possess current technical skills and knowledge.

Framework: Based on the research thesis, this model includes stages of concrete experience, reflective observation, and active experimentation within industry settings.

Key Initiative 3: Integration of Experiential Learning

Action: Shift from problem-based learning to a 'work experimental based regulation discovery' model.

Methodology: Utilize Portfolios of Evidence (PoE) that document diagnosis, troubleshooting, use of modern equipment, and solutions to real-world industrial problems.

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Component 2: A Technology-Enabled Ecosystem for Administration & Learning

Key Technology 1: Centralized e-Portfolio Management System (EPMS)

- **Purpose**: A single, secure digital repository for all student work, assessments, and practical evidence, accessible by learners, lecturers, moderators, and SAQA/DHET.
- **Benefit**: Eliminates physical document loss ("Portfolio damage"), streamlines moderation, and provides an auditable trail for qualification verification. Addresses "non credible process."

Key Technology 2: Automated Qualification Processing

- **Purpose**: An integrated data portal linking TVET college records, PoE systems, and DHET/SAQA databases.
- **Benefit**: Automates the verification of completed modules and practical hours to drastically reduce the N-Diploma backlog and eliminate manual "irregularite record transcript" issues.

Key Technology 3: Enhanced Learning Management System (LMS) Integration

- **Purpose**: Utilize LMS platforms not just for content delivery, but for formative assessments, peer reviews, and tracking progress against competency frameworks.
- **Theoretical Basis**: Built on the Technology Acceptance Model (TAM) to ensure lecturer and student adoption.

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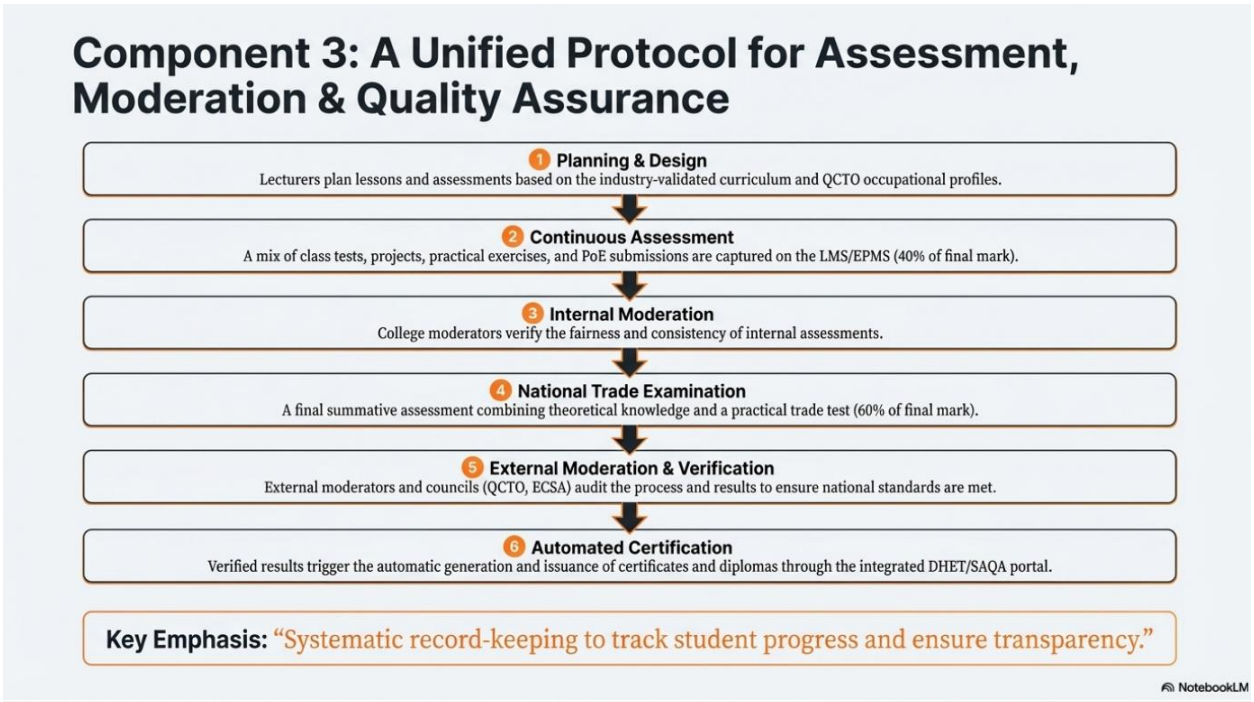
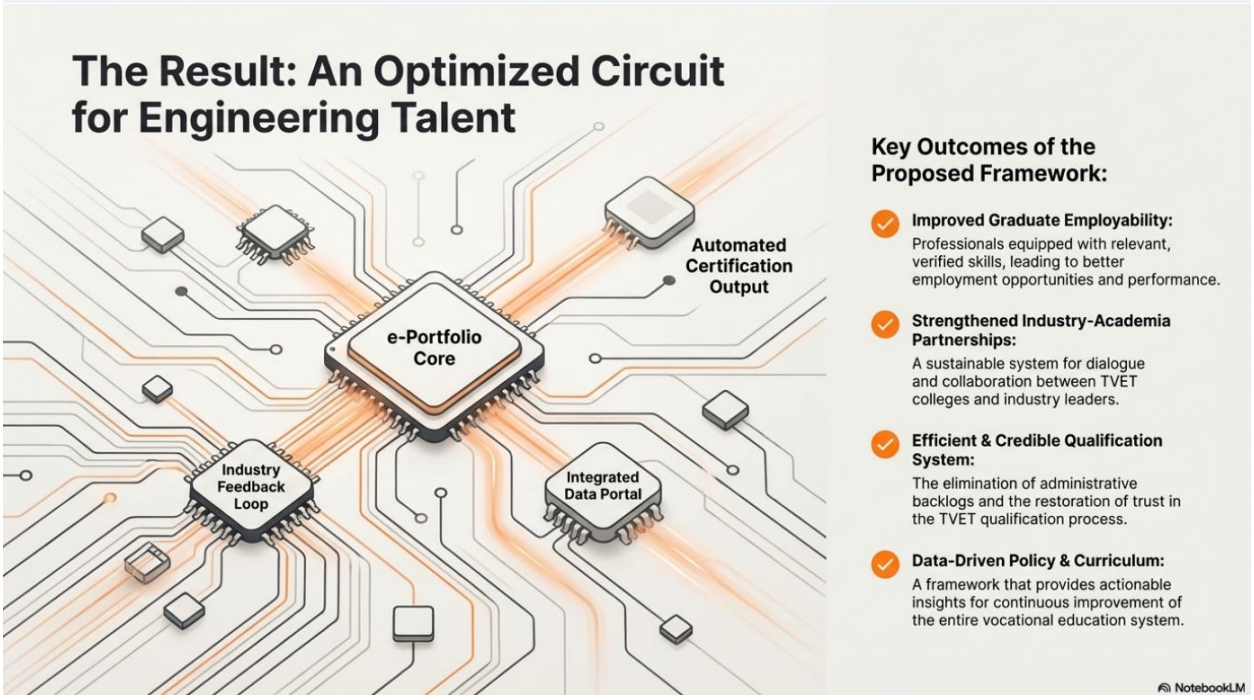
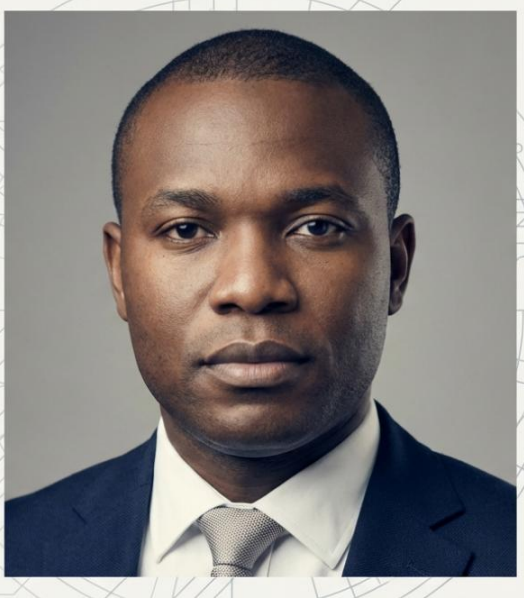

Component 3: A Unified Protocol for Assessment, Moderation & Quality Assurance
1 Planning & Design
Lecturers plan lessons and assessments based on the industry-validated curriculum and QCTO occupational profiles.
2 Continuous Assessment
A mix of class tests, projects, practical exercises, and PoE submissions are captured on the LMS/EPMS (40% of final mark).
3 Internal Moderation
College moderators verify the fairness and consistency of internal assessments.
4 National Trade Examination
A final summative assessment combining theoretical knowledge and a practical trade test (60% of final mark).
5 External Moderation & Verification
External moderators and councils (QCTO, ECSA) audit the process and results to ensure national standards are met.
6 Automated Certification
Verified results trigger the automatic generation and issuance of certificates and diplomas through the integrated DHET/SAQA portal.
Key Emphasis: "Systematic record-keeping to track student progress and ensure transparency."
NotebookLM


The Result: An Optimized Circuit for Engineering Talent
Automated Certification Output
e-Portfolio Core
Industry Feedback Loop
Integrated Data Portal
Key Outcomes of the Proposed Framework:
Improved Graduate Employability:
Professionals equipped with relevant, verified skills, leading to better employment opportunities and performance.
Strengthened Industry-Academia Partnerships:
A sustainable system for dialogue and collaboration between TVET colleges and industry leaders.
Efficient & Credible Qualification System:
The elimination of administrative backlogs and the restoration of trust in the TVET qualification process.
Data-Driven Policy & Curriculum:
A framework that provides actionable insights for continuous improvement of the entire vocational education system.
NotebookLM

A Portfolio of Resilience & Expertise

The Case for Recognition:
Tshingombe Tshitadi Fiston



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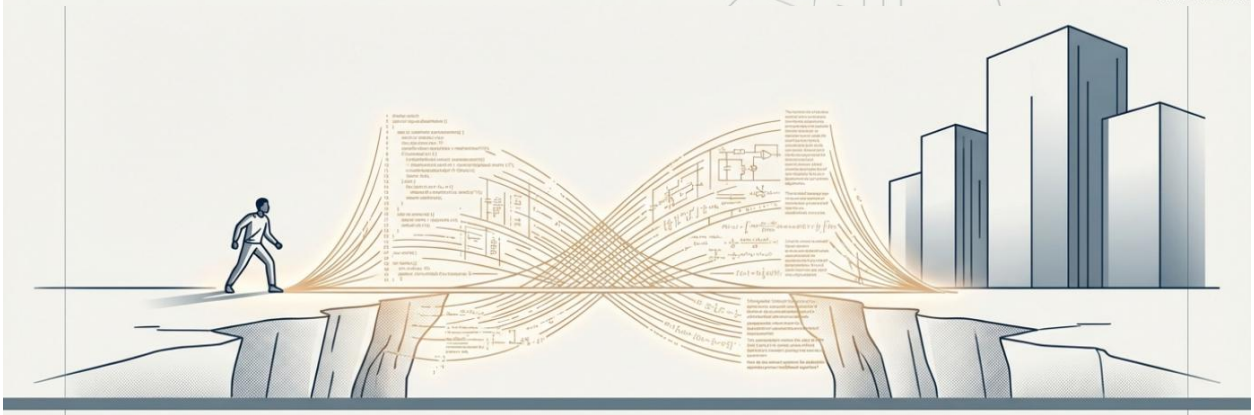

A Self-Driven Journey to Bridge a Systemic Divide

This portfolio documents a multi-year, self-directed pursuit of interdisciplinary knowledge, spanning electrical engineering, artificial intelligence, and educational policy. Tshingombe Tshitadi Fiston has proactively acquired in-demand skills and developed sophisticated research proposals, yet has consistently encountered systemic barriers to formal recognition. This presentation makes the case that this body of work merits official validation, posing a critical question: How do our current systems for evaluation recognize proven, non-traditional expertise?

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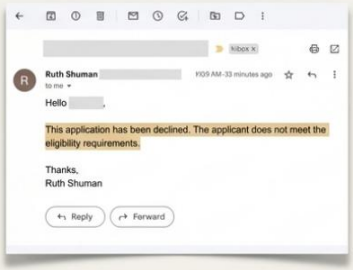
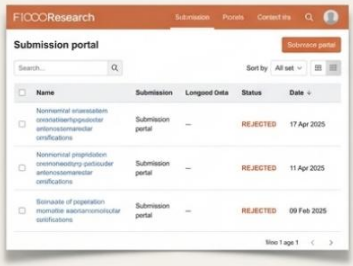
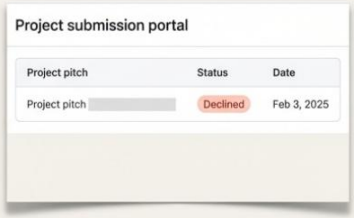
Navigating the Gauntlet of Systemic Rejection







Consistent, high-effort engagement with funding and academic bodies has been met with procedural and eligibility-based rejections, highlighting a gap between demonstrated capability and systemic recognition.

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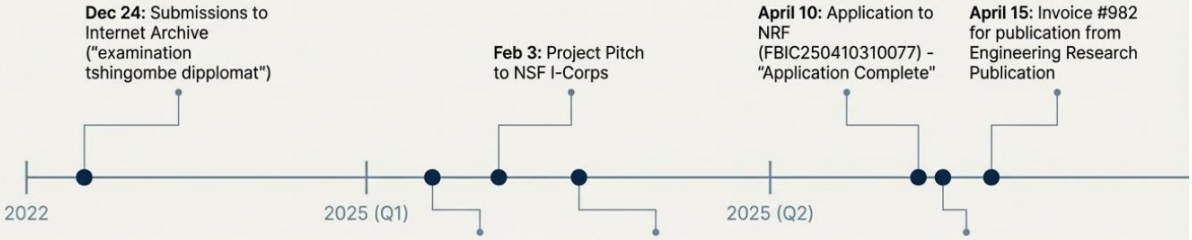
A Timeline of Persistent Engagement


Dec 24: Submissions to Internet Archive ("examination tshingombe dipplomat")
Feb 3: Project Pitch to NSF I-Corps
April 10: Application to NRF (FBIC250410310077) - "Application Complete"
April 15: Invoice #982 for publication from Engineering Research Publication
2022
2025 (Q1)
2025 (Q2)
Jan 24: Article submission to F1000Research ("Research education technology...")
Feb 18: Paper "IJETR3147" accepted by IJETR (payment pending)
April 11: Multiple applications to NRF (Thuthuka PhD Track, Support for Y-rated Researchers) - "Application In Progress"

The timeline demonstrates a strategic and sustained effort to achieve recognition through every available formal channel, from research publications to national funding bodies.

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Grounded in Core Electrical Engineering Principles

Foundational Theory & Application

- Ohm's Law, Kirchhoff's Laws, Circuit Analysis
- AC/DC Machine Theory, Transformers
- SANS 10142-1 of 2017 installation requirements
- Certificate of Compliance documentation
- Experiment: Efficiency and voltage regulation of a single phase transformer by direct loading

Systems & Control

- Control Systems Engineering (open/closed loop)
- Ward Leonard control systems
- Smart Grids & Power System Stability
- Industrial Components: Schneider Electric, Altivar 12

Curriculum & Pedagogy

- Framework: Scottish Qualifications Authority (SQA) National 4 Skills for Work
- Curriculum Design for N-level courses (N1-N6)
- Subjects: Electrical Trade Theory, Industrial Electronics

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Editorial Consulting

Proactive Mastery of AI and Data Science Technologies

AI & Machine Learning (Nov 2023 - May 2024)

- Azure AI Search (Create solution, custom skills) — Nov 2023
- Image Classification & Object Detection — Jan 2024
- PyTorch (Intro, Computer Vision, NLP) — Feb 2024
- Azure Machine Learning (Designer, Automated ML) — Apr 2024
- Use your own data with Azure OpenAI Service — May 2024

Data & Analytics (March 2024)

- Microsoft Fabric (Administer, Real-Time Analytics) — Mar 2024
- Data Activator in Microsoft Fabric — Mar 2024
- Power BI Deployment Pipeline — Mar 2024

Software & DevOps (Nov 2023)

- C# (do-while, for, switch-case statements) — Nov 2023
- Python (Jupyter notebooks, error handling, dictionaries) — Nov 2023
- GitHub Copilot (JavaScript, Intro) — Nov 2023
- GitHub Actions (Deploy a model, trigger jobs) — Nov 2023

A concentrated, self-directed curriculum focused on the Microsoft ecosystem, demonstrating proficiency across the entire data lifecycle from development and deployment to analytics and AI.

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Synthesizing Knowledge into Innovative Research Proposals

Smart Grid & AI-Based Automation

AI-Based Predictive Maintenance in Industrial Systems: Machine learning for fault detection in power transformers.

Smart Grid and Energy Storage Technologies: Enhancing demand response strategies using machine learning; Optimization of battery energy storage for grid stabilization.

Advanced Manufacturing & EdTech

NSF SBIR/STTR Topic: Advanced Manufacturing (M)

Brief Description: Education technology relate low manufacture thesis. low outcome framework qualicafition. invrstigation energie rurale framework...

Wireless Technologies

Wireless Power Transmission: Developing high-efficiency resonant inductive coupling systems; Applications of wireless power transfer in electric vehicles.

> "Technical Objectives and Challenges: ...deploy generative job framework undercover job in next generation..."

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A Vision for Reforming Technical & Vocational Education

1. Curriculum Design & Assessment

- TVET curriculum modules, Didactic methods (ADDIE model), Outcome-based education, Formative vs. Summative assessment.

Technology:
- LMS integration (Blackboard, Google Classroom), Technology Acceptance Model (TAM).

2. Mentoring & Career Development

Framework Title: Career Discovery and Mentoring Framework for Technical and Vocational Education.

Tools:
- Use of platforms like Alison for "Career Ready Plans," résumé builders, and aptitude tests.

Psychometrics:
- Use of assessments to identify aptitudes, learning barriers, and career inclinations.

3. Systemic Critique & Proposed Solutions

Identified Problems:
circulum regulation irregularity material script, backlog system.

Proposed Solution:
...need to implement **adaptative system**... to discern and isolate the sicio economic environment engineering...

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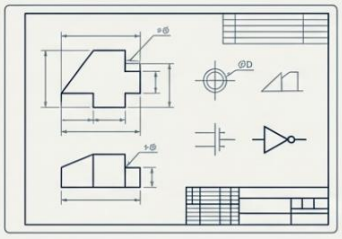
From Theory to Practice: A Portfolio of Applied Projects

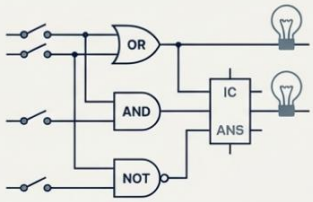
Digital Design & Analysis



"Copy Of PROJECT DRAWING WORKSHET TSHINGOMBE DESIGN ANALYSE ENGIN..."

Documentation of analysis and investigation in engineering design from Internet Archive submissions.

Hands-On Electronics



"Exercise 4.1.173: Practice on Various Logics Using Logic Gates and Circuits."

Learning Objectives:

- Construct and verify OR, AND, and NOT gates using switches, lamps, and ICs...
- Identify and test TTL and CMOS logic ICs (7408, 7432, 7404, CD4079).

Public Project Submissions

"thesis-master-rural", "thesis-policy-security-on-master-component-circulum-1"

2 views | 0 comments

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Engaging with the Complexities of Policy, Law, and Regulation

Qualifications & Education

Bodies

- SAQA (South African Qualifications Authority), DHET (Department of Higher Education and Training), QCTO, Umalusi.

Frameworks

Deep familiarity with the NQF (National Qualifications Framework) and its sub-frameworks (HEQSF, GFETQSF).

Labour & Industry

Legislation

- Labour Relations Act 66, Pension Funds Act 24, CCMA (Commission for Conciliation, Mediation and Arbitration) rules.

Case Law Reference

Direct mention of case numbers like 'GAjb6808-15' and 'jr 2461/15 Na 37/19'.

Security & Policing

Topics

- Analysis of police operations, criminal justice system, evidence preservation, forensic science laboratory procedures.

Regulatory Context

Private Security Industry Regulatory Authority (PSIRA), Trespass Act, Arms and Ammunition Act.

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The Innovator's Gauntlet: Forging Expertise Through Adversity

THE GAUNTLET (Systemic Hurdles)

- NSF I-Corps Application: **Declined**
- Multiple Research Submissions: **Rejected**
- National Research Foundation (NRF) Grants: **In Progress / Under Review**
- SAQA & DHET Qualifications: **Navigating Irregularities & Backlogs**

THE EXPERTISE (Demonstrated Competencies)

- **Electrical Engineering:** Power Systems, SANS Standards, Control Theory
- **AI & Data Science:** Azure AI/ML, Microsoft Fabric, Python, C#
- **Educational Technology & Policy:** TVET Reform, Curriculum Design, Assessment Theory
- **Regulatory & Legal Systems:** NQF Frameworks, Labour Law, Industrial Standards

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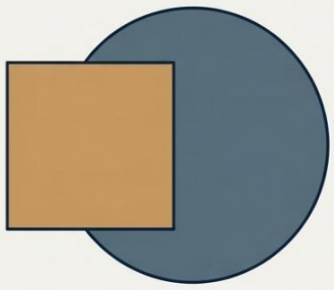
A System Designed to Measure Credentials, Not Competence

When a highly motivated individual acquires and applies deep, interdisciplinary knowledge outside of traditional channels, how can our systems accurately measure their capability?

The evidence demonstrates a fundamental disconnect. Our evaluation frameworks are optimized for linear, institutional pathways and standardized credentials. They often fail to account for:

- **Interdisciplinary Synthesis**: The ability to combine knowledge from fields like AI, engineering, and policy.
- **Self-Directed Learning**: The initiative to master complex subjects using modern digital resources.
- **Applied Innovation**: The capacity to generate novel solutions, demonstrated through research proposals and projects.

This case reveals a critical gap in how we identify and validate talent in the 21st century.



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A Proposal for Formal Portfolio Recognition

The Request

- ****Recognition of Qualifications****: To formally acknowledge the demonstrated mastery of knowledge and skills against the National Qualifications Framework (NQF).
- ****Resolution of Irregularities****: To address and rectify the documented 'backlog system' and institutional data discrepancies.
- ****Validation of Vocational Experience****: To certify the extensive practical and applied learning demonstrated through projects and research.

Proposed Action

We petition for a comprehensive portfolio assessment by a qualified panel to map the evidence against the criteria for a relevant qualification at NQF Levels 7, 8, or 9 in an appropriate engineering and technology field.

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An Opportunity to Set a New Precedent

Evaluating this portfolio is more than an administrative decision; it is a chance to pioneer a modern approach to talent recognition.

By formally validating this body of work, this committee can:

- **Champion Non-Traditional Pathways:** Establish a credible framework for assessing expertise acquired through self-study, online certification, and project-based learning.

- **Address Systemic Gaps:** Create a replicable model for resolving academic record irregularities and recognizing interdisciplinary skill sets.

- **Innovate in Evaluation**: Move beyond a reliance on traditional credentials to a more holistic and evidence-based assessment of competence.

This case offers a unique opportunity to lead the way in defining how we recognize the innovators of tomorrow.

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Contact & Comprehensive Documentation

Contact Information

Name: Tshingombe Tshitadi Fiston

Email: tshingombefiston@gmail.com

ORCID iD: 0009-0005-2690-9559

Access to Full Portfolio

A comprehensive digital archive containing all supporting documents, certificates, applications, and project files is available for review.

Link/Reference: Hosted on Internet Archive (archive.org/details/@rdferz) and GitHub.

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The South African Engineer's Journey: Navigating Education & Career

The National TVET & Qualification Framework
DHET, SAQA, & QCTO
Governed by Key Regulatory Bodies oversee the entire technical education and qualifications system.
NQF
Structured by the National Qualifications Framework (NQF) standardizes all qualifications, from certificates to degrees, across different levels.
TVET Colleges
Provide Practical, Hands-On Skills delivering practical skills aligned with industry needs.
The Individual's Journey: Challenges & Advancement
Microsoft
Schneider Electric
Eskom
IT
SARS
Systemic Hurdles: Navigating 'Irregularities' & Backlogs
Professionals often face delays due to administrative backlogs and qualification assessment irregularities.
Continuous Upskilling is Essential for Career Growth
Individuals pursue ongoing professional development with industry leaders like Microsoft and Schneider Electric.
The Ultimate Goal: Employment in Key Sectors
Career paths target vital industries such as energy (Eekom), IT, and public service (SARS).
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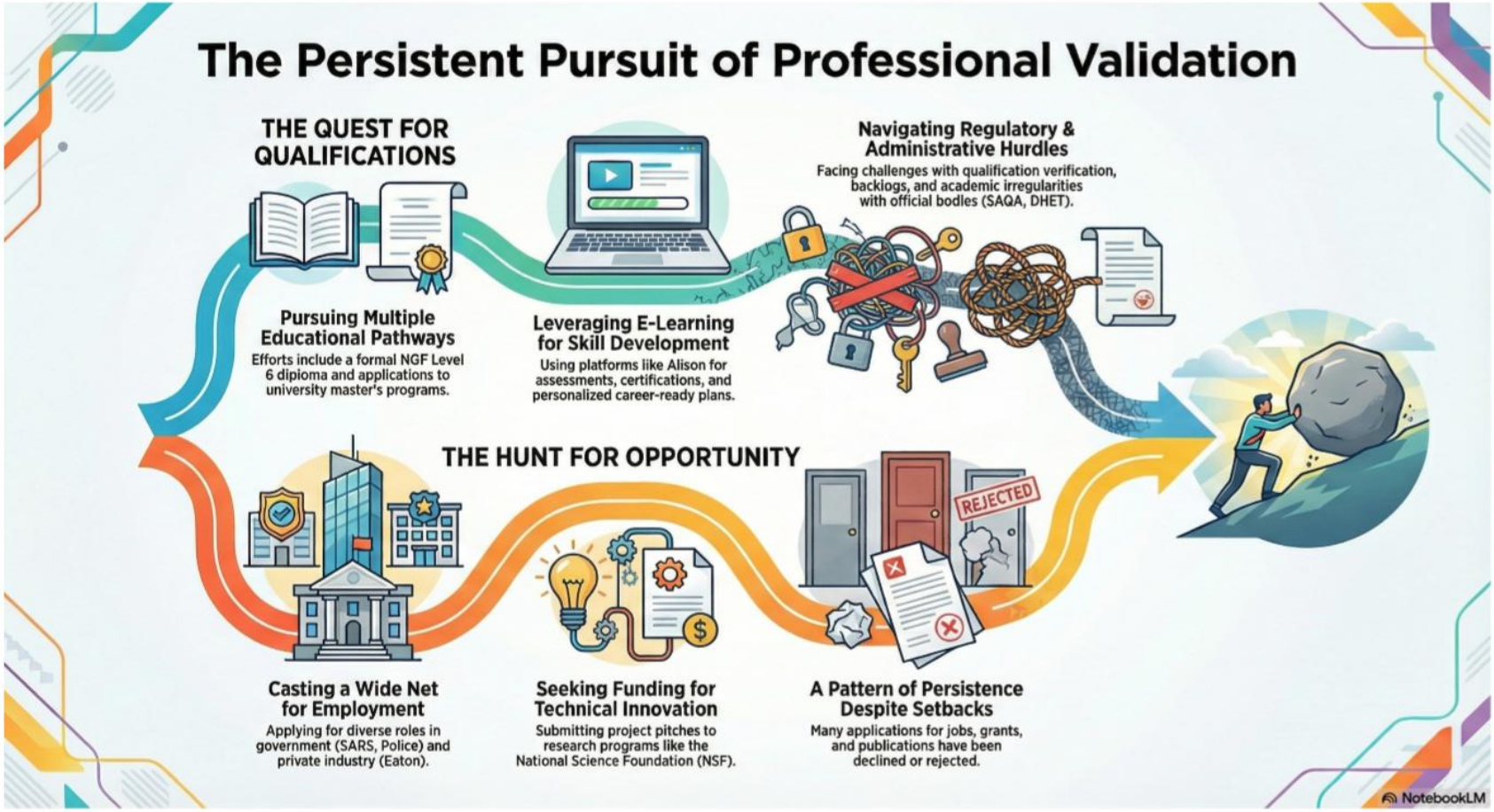
The Persistent Pursuit of Professional Validation
THE QUEST FOR QUALIFICATIONS
Pursuing Multiple Educational Pathways
Efforts include a formal NGF Level 6 dipioma and applications to university master's programs.
Leveraging E-Learning for Skill Development
Using platforms like Alison for assessments, certifications, and personalized career-ready plans.
Navigating Regulatory & Administrative Hurdles
Facing challenges with qualification verification, backlogs, and academic irregularities with official bodies (SAQA, DHET).
THE HUNT FOR OPPORTUNITY
REJECTED
Casting a Wide Net for Employment
Applying for diverse roles in government (SARS, Police) and private industry (Eaton).
Seeking Funding for Technical Innovation
Submitting project pitches to research programs like the National Science Foundation (NSF).
A Pattern of Persistence Despite Setbacks
Many applications for jobs, grants, and publications have been declined or rejected.
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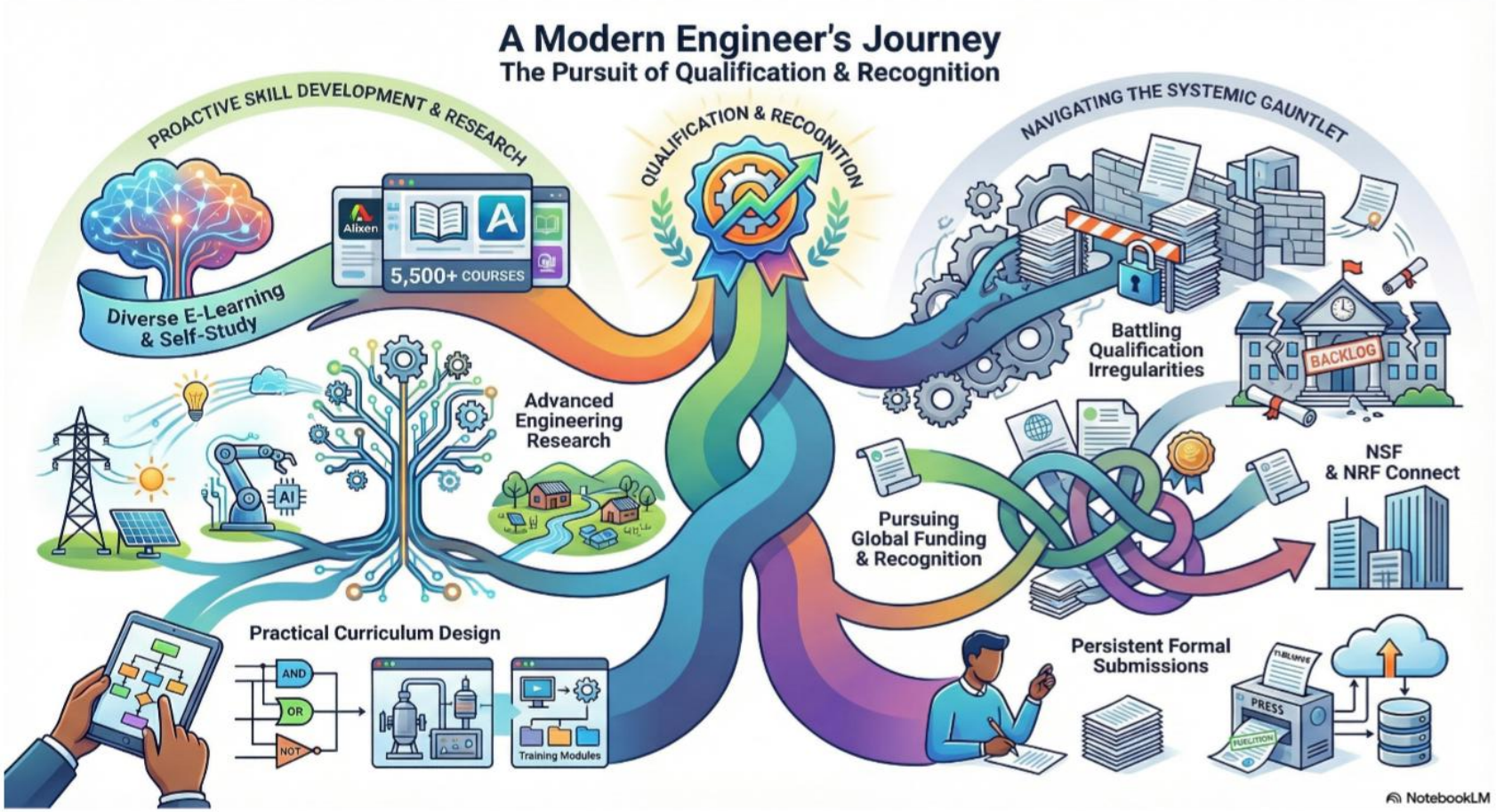
A Modern Engineer's Journey
The Pursuit of Qualification & Recognition
PROACTIVE SKILL DEVELOPMENT & RESEARCH
QUALIFICATION & RECOGNITION
NAVIGATING THE SYSTEMIC GAUNTLET
Diverse E-Learning & Self-Study
Alixen
5,500+ COURSES
Advanced Engineering Research
AI
Practical Curriculum Design
AND
OR
NOT
Training Modules
Battling Qualification Irregularities
BACKLOG
Pursuing Global Funding & Recognition
NSF & NRF Connect
Persistent Formal Submissions
PRESS
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An Architected System of Expertise

A Portfolio of Evidence Demonstrating Integrated, Multidisciplinary Capability for Tshingombe Tshitadi Fiston

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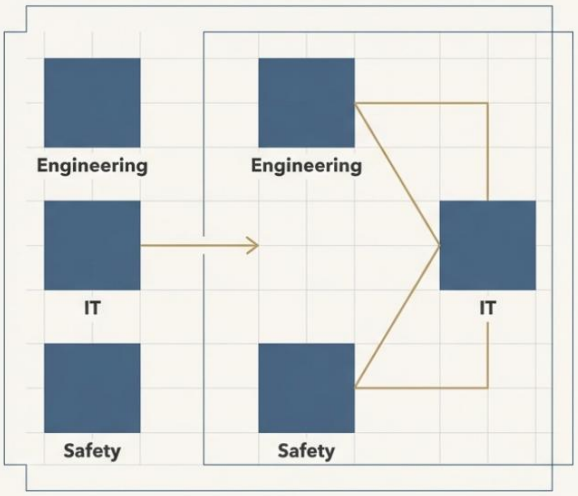
The Challenge: Validating Integrated Knowledge in a Specialized World

Standard credentialing systems excel at verifying discrete, linear qualifications. However, they often struggle to assess expertise that is multidisciplinary, self-directed, and integrated through practical application.

The core challenge is demonstrating not just what has been learned, but how disparate knowledge domains have been synthesized into a single, functional capability.

This presentation serves as a formal Portfolio of Evidence, designed to bridge this gap. It provides a structured walkthrough of a consciously designed system of knowledge, built to meet the rigorous verification standards of bodies like DHET and SAQA.



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The Blueprint: A Three-Part Framework for Capability

1. The Pillars of Knowledge (The Components)
Establishing the foundational breadth of learning across strategic domains.
2. The Nexus of Application (The Connections)
Demonstrating how these pillars connect to solve real-world problems.
3. The Architecture of Synthesis (The System)
Showcasing the creation of new frameworks to manage, validate, and scale this integrated knowledge.

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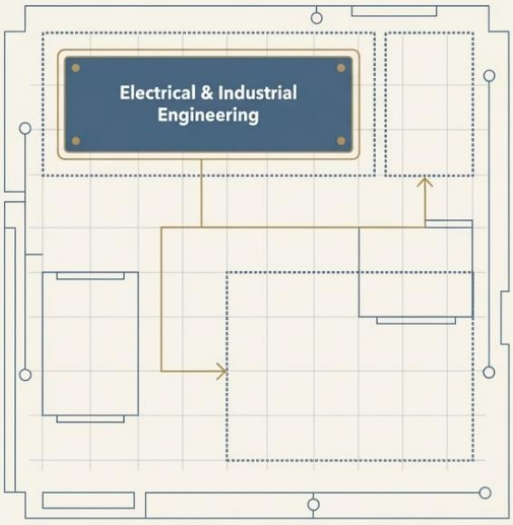
Pillar I: Foundational Expertise in Electrical & Industrial Engineering



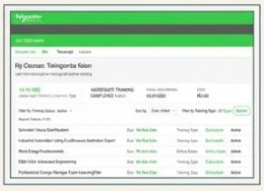
Key Qualifications & Training

National N Diploma: Electrical Engineering

- St. Peace College, aligned with QCTO and NATED standards.
- **Core Subjects N1-N6:** Mathematics, Engineering Science, Electrical Trade Theory, Industrial Electronics, Electrotechnics, Plant Operation.

Industry-Specific Training

- **Schneider Electric:** Extensive training (140+ courses) in industrial systems, including EcoStruxure Automation Expert, PowerLogic Protection Engineering, and Modicon Switches.
- **Eaton Power:** Specialised learning in Power Quality Analysis, Low Voltage Switchgear, and Arc Flash Analysis.



Schneider Electric EATON

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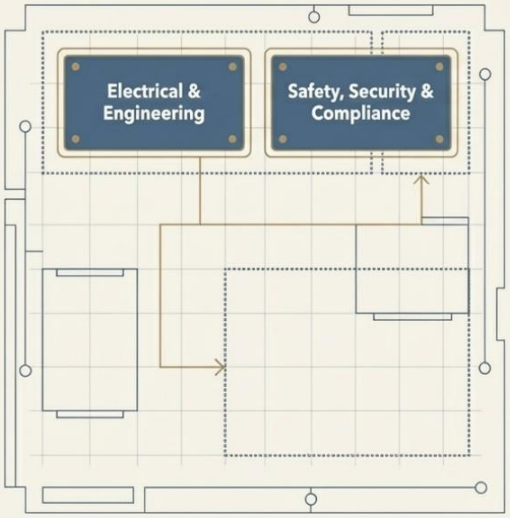
Pillar II: Mastery of Safety, Security & Compliance Frameworks



Key Competencies & Verification

Statutory & Regulatory Knowledge

- Deep familiarity with the PSIRA Act, OHS Act 85 of 1993, CCMA procedures, and SANS electrical standards (e.g., SANS 10142).

Functional Safety

- Understanding and application of industrial safety standards like IEC 61508 and Safety Integrity Level (SIL) requirements.

Security Operations

- Training in security provision, patrol conduct, handling complaints, and applying legal aspects in a security environment.

Evidence

- Training and verification with bodies like SASSETA and PSIRA.

PSiRA — SASSETA — SANS

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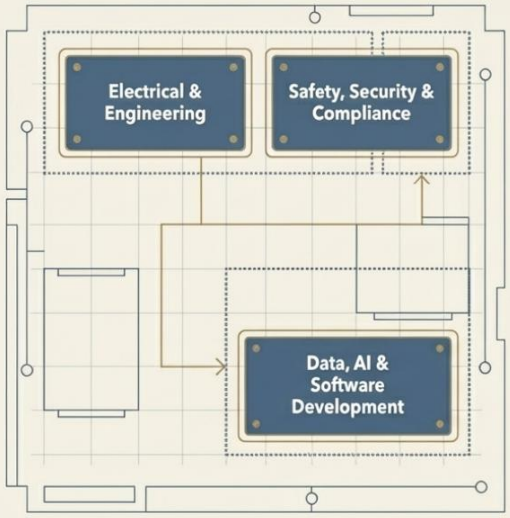
Pillar III: Capability in Data, AI & Software Development



Core Digital Literacy

AI & Data Science

- Completion of the Microsoft AI Fluency Program (in partnership with Sci-Bono), with knowledge of data's role as the 'fuel for AI,' pattern identification, and machine learning models.
- Training in data visualization and analysis with Salesforce Tableau.

Software & Cloud Development

- Proficiency in Visual Basic for Applications (VBA) for system automation.
- Experience with developer ecosystems including GitHub for version control and Microsoft Azure DevOps.

Cybersecurity

- Training in enterprise IT topics, code security reviews, and cloud security policies (GDPR).

Microsoft — salesforce — GitHub

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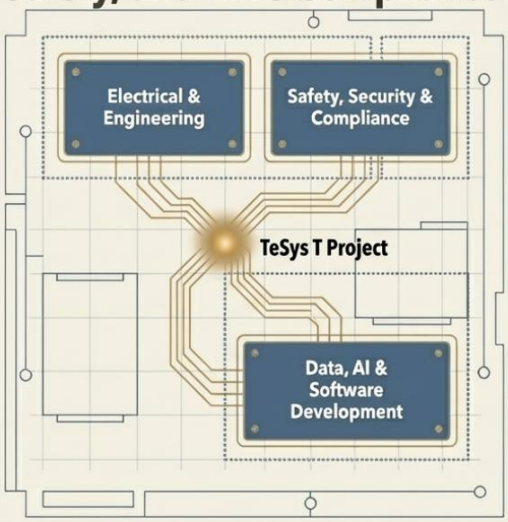
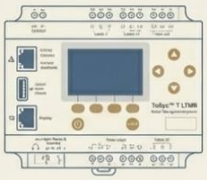
The Nexus of Application: Integrating Motor Management, Safety, and EMC Compliance





Case Study: Configuration and deployment of the TeSys™ T LTMR Motor Management System.

Integrated Skills in Action:

- **Pillar I (Electrical Engineering):** Wiring the LTMR controller, understanding power requirements (24 Vdc / 100-240 Vac), and configuring parameters for thermal overload, phase imbalance, and load behavior.
- **Pillar II (Compliance):** Ensuring adherence to EMC standards for industrial environments, applying functional safety principles, and managing risks associated with hardware/software failure.
- **Pillar III (Data & Software):** Utilizing configuration tools like SoMove and HMI devices (Magelis) to program the system and monitor diagnostics.

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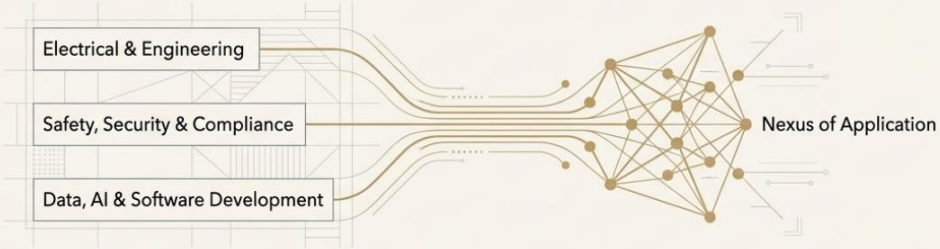
The Nexus of Application: From Project Procurement to National Research Initiatives



Practical Project Management (Sci-Bono ICT Academy)

- **Scope**: "Proposed implementation option for phase 1 product database."
- **Process Design:** Architected a workflow across 14 departments.
- **Financials:** Managed procurement processes including requisitions (R1000), RFQs (R10000), and purchase orders (R10000).

Strategic Research & Development (National Research Foundation)

- Authored and submitted multiple concept notes and grant applications.
- **Thematic Areas:** ICT, Health, Energy, Development Studies, and Agile Transport.
- Demonstrates the ability to synthesize knowledge across disciplines to frame and propose large-scale, innovative research projects.

NRF National Research Foundation

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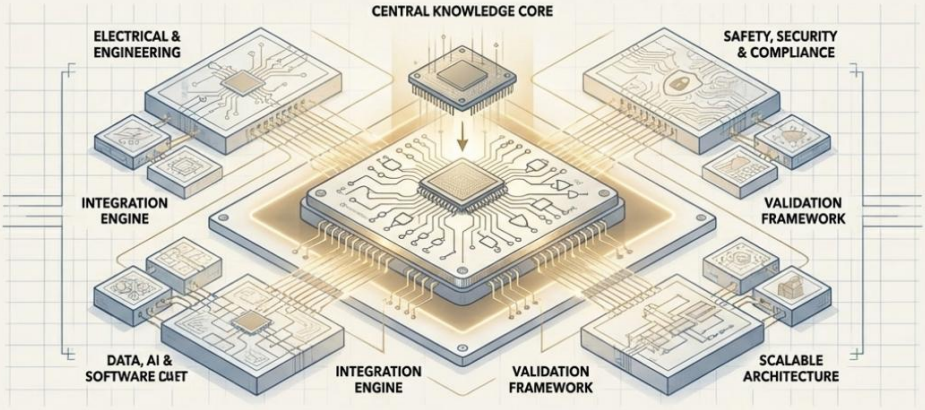
The Architecture of Synthesis: Engineering a Personal Knowledge Management System



Acquiring and applying knowledge is the foundation of expertise. The highest order of mastery, however, lies in creating systems to structure, validate, manage, and scale that knowledge.

The following slides showcase a self-designed architecture built using software development principles, formal logic, and deep regulatory analysis.

deep to regulatory analysis. This is the control system for a career—a framework designed for integrity, traceability, and continuous integration.

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System Component I: The Record Management Engine

Core Technology

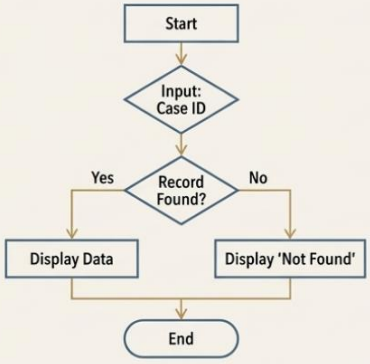
A bespoke system built in **Visual Basic for Applications (VBA)** to automate the management of career, educational, and legal records.

Key Features

- **Logical Flow Design (`Logigramme`):** Visual diagrams mapping high-level decision logic for processes like case search, filtering, and updates.
- **Procedural Logic (`Algorigramme`):** Code-based flowcharts detailing the procedural logic for custom UserForms, data validation, and database interactions.
- **Custom Interfaces (`UserForms`):** Development of modular forms (e.g., `UserForm4´, `KfrmArchiveIPValidator`) for specific tasks like certificate issuance, IP validation, and incident logging.
- **Data Integrity:** Implementation of a SHA-256 hash function in VBA to ensure the integrity of records.

```
Function CalculateSHA256(ByVal sIn As String) As String
    ' Example VBA Code Snippet for SHA-256 Hashing
    Dim oT As Object, oSHA256 As Object
    Set oT = CreateObject("System.Text.UTF8Encoding")
    Set oSHA256 = CreateObject("System.Security.Cryptography.SHA256Managed")
    CalculateSHA256 = ToHex(oSHA256.ComputeHash_2(oT.GetBytes_4(sIn)))
End Function
```

Simplified Logigramme: Case Processing Logic



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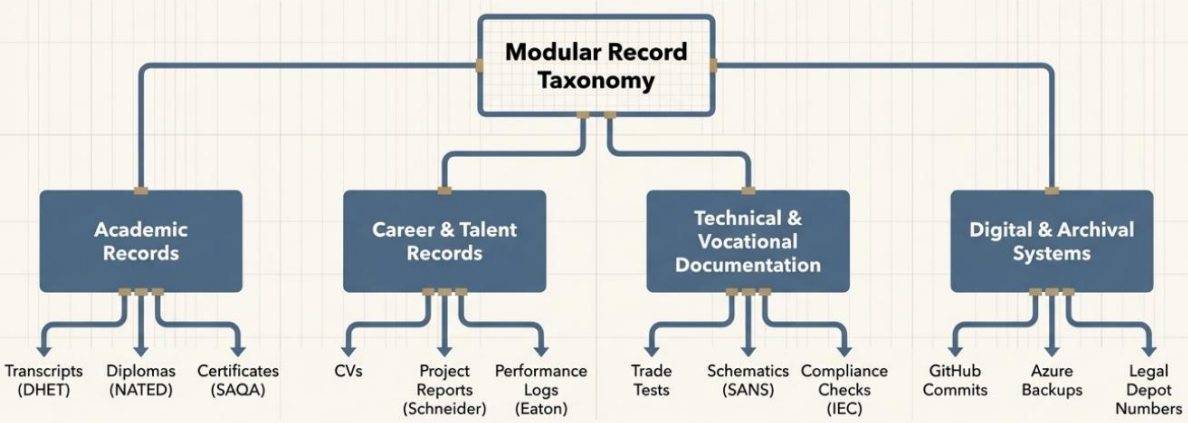
System Component II: A Formal Taxonomy for Integrated Credentials

A self-designed 'Modular Record Taxonomy' to classify and manage a diverse and sprawling body of evidence. This system creates a coherent structure for otherwise disconnected documents.



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System Component III: The SAQA-Compliant Verification Framework

Overview: A deep analysis of the legal, technical, and design requirements for creating fully compliant South African national diplomas, showcasing the ability to architect credibility.

Analysis of SAQA-Compliant Certificate Elements	
Element	**Description**
Qualification Metadata	NQF Level (e.g., Level 6), Total Credits (360), SAQA QUAL ID, Progression pathways.
Security Features	QR codes, holograms, watermarks, integration with National Learners' Records Database (NLRD).
Legal Compliance	Adherence to Heraldry Act, Merchandise Marks Act, and NARS record-keeping standards.
Layout & Design	A4 size, 20-25mm margins, clear information hierarchy, placement of logos and seals.

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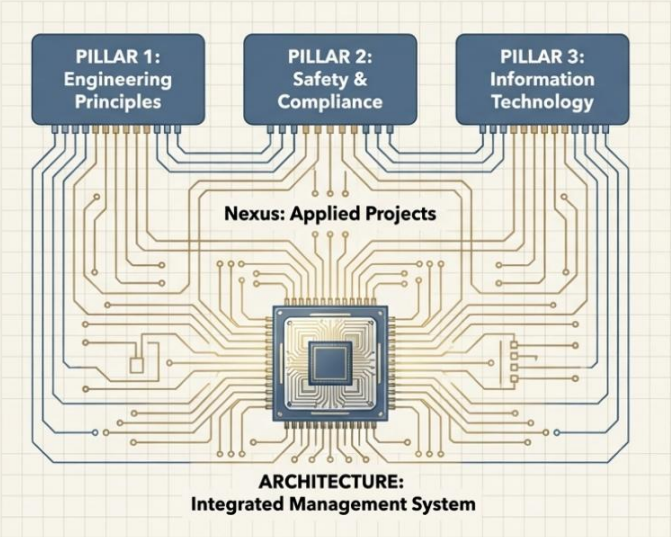
The Complete System: A Demonstrable Capability for Design, Analysis, and Synthesis


PILLAR 1: Engineering Principles
PILLAR 2: Safety & Compliance
PILLAR 3: Information Technology
Nexus: Applied Projects
ARCHITECTURE: Integrated Management System

- **Foundational knowledge in Engineering, Safety, and IT** to analysis for matidate toeast in automatics, and condensal engineering distomats for milaras.
- **...is integrated through practical application in industrial automation, project management, and R&D** to easp analytics, naturadt management, and interests.
- **...and is managed, validated, and scaled by a self-designed architectural framework.** This architectural is genaeshemmetry.

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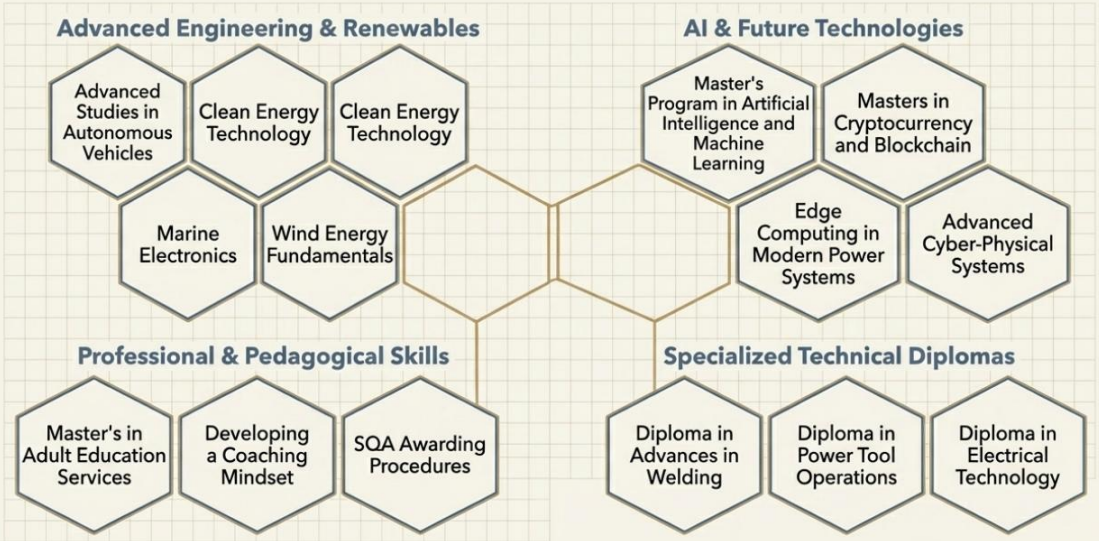
Evidence of Continuous Learning: A Curation of Cross-Disciplinary Modules


Advanced Engineering & Renewables
Advanced Studies in Autonomous Vehicles
Clean Energy Technology
Clean Energy Technology
Marine Electronics
Wind Energy Fundamentals
AI & Future Technologies
Master's Program in Artificial Intelligence and Machine Learning
Masters in Cryptocurrency and Blockchain
Edge Computing in Modern Power Systems
Advanced Cyber-Physical Systems
Professional & Pedagogical Skills
Master's in Adult Education Services
Developing a Coaching Mindset
SQA Awarding Procedures
Specialized Technical Diplomas
Diploma in Advances in Welding
Diploma in Power Tool Operations
Diploma in Electrical Technology

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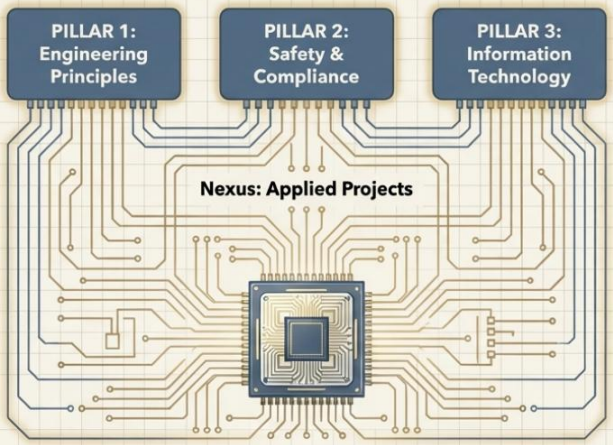
A Blueprint for Recognition



This portfolio demonstrates more than the sum of its parts. It is evidence of a systematic, architectural approach to building and validating professional capability.

The ability to synthesize disparate domains, solve complex problems, and engineer systems for knowledge management is a distinct and valuable form of expertise.

This architected system represents a robust model for lifelong learning and warrants formal recognition as a comprehensive and coherent body of work.

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The Integrated Architect

Synthesizing a Transdisciplinary Career from a World of Knowledge

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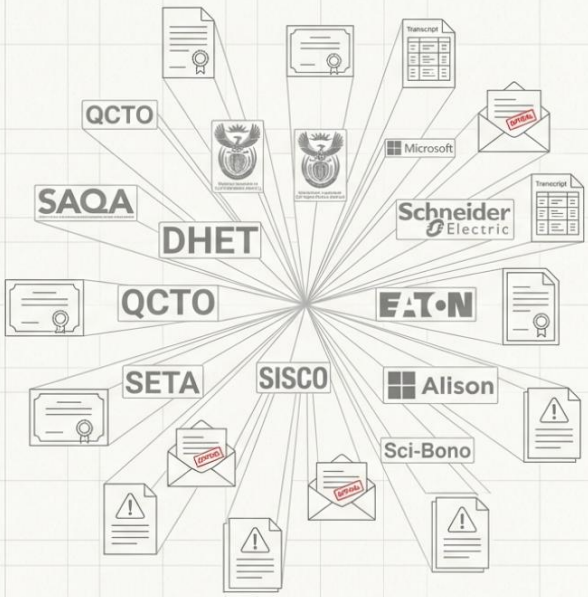
The Modern Professional's Dilemma: A World of Fragments

Expertise is abundant, but integration is scarce. In a world of continuous learning, professionals accumulate a vast collection of degrees, certificates, and digital badges. How do we build a coherent, verifiable identity from this fragmented journey?



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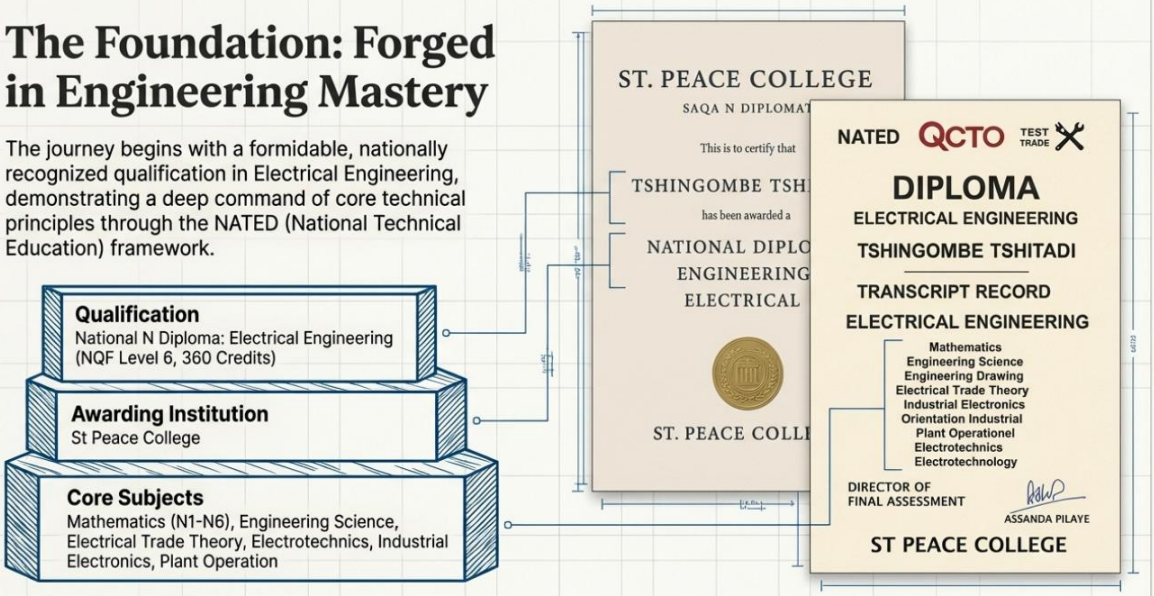
The Foundation: Forged in Engineering Mastery

The journey begins with a formidable, nationally recognized qualification in Electrical Engineering, demonstrating a deep command of core technical principles through the NATED (National Technical Education) framework.

Qualification
National N Diploma: Electrical Engineering (NQF Level 6, 360 Credits)

Awarding Institution
St Peace College

Core Subjects
Mathematics (N1-N6), Engineering Science, Electrical Trade Theory, Electrotechnics, Industrial Electronics, Plant Operation



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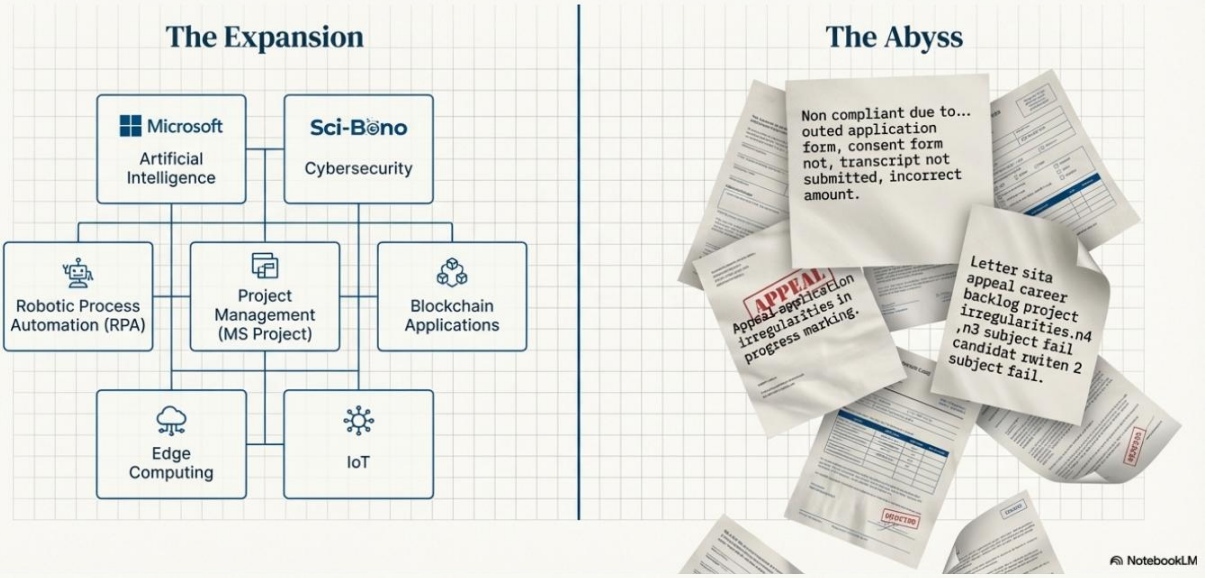
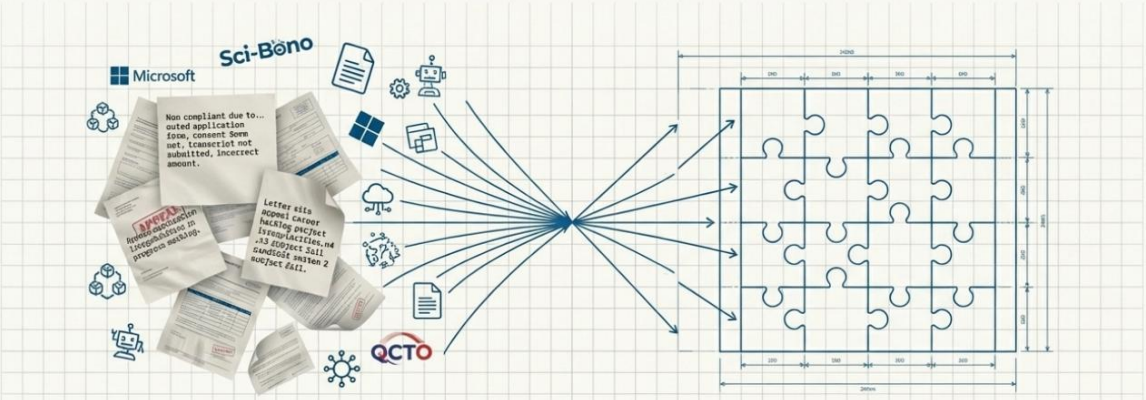
The Expansion & The Abyss of Disintegration



A New Blueprint: From Collector to Architect



When faced with complexity, the solution isn't to stop learning. It's to start engineering a better system. This is the shift from being a collector of credentials to an **architect of capability.**

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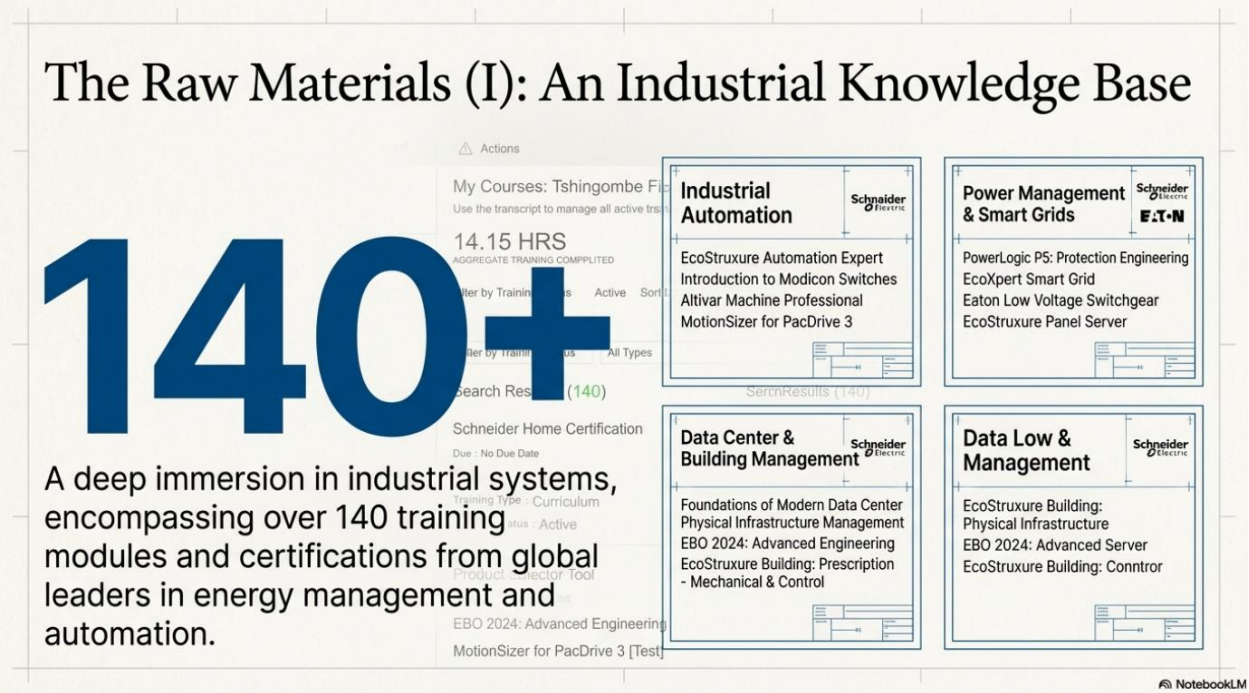
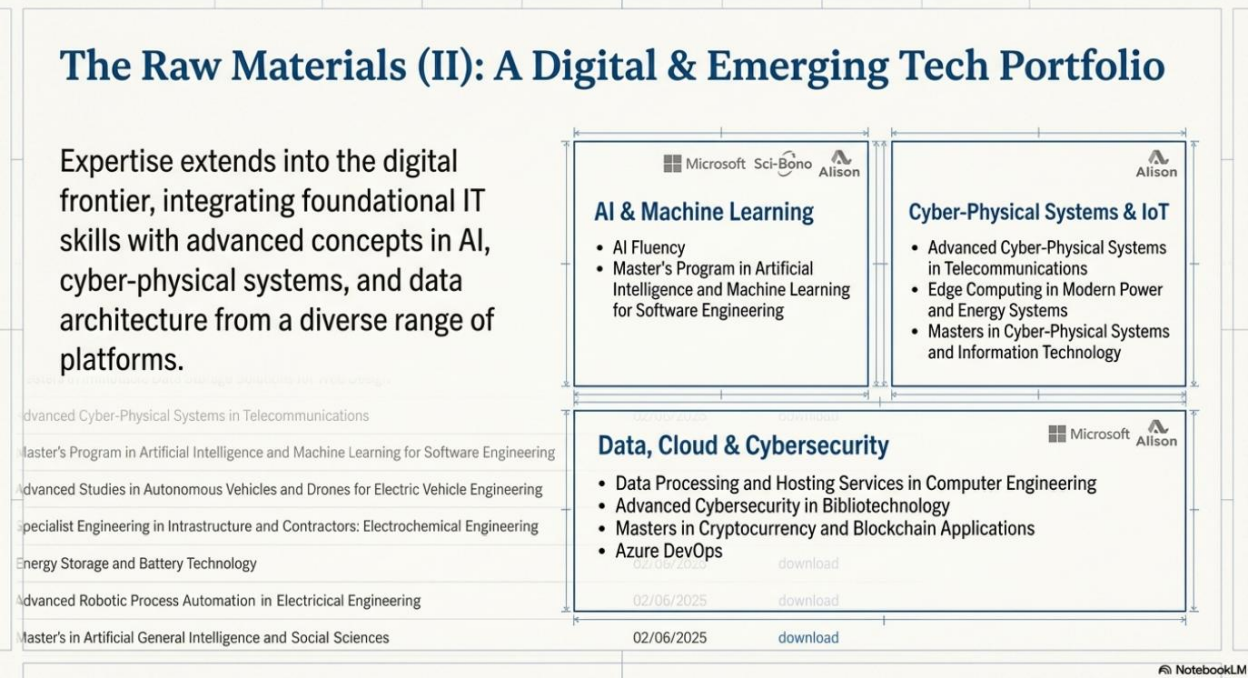

The Raw Materials (I): An Industrial Knowledge Base
140+
A deep immersion in industrial systems, encompassing over 140 training modules and certifications from global leaders in energy management and automation.
Industrial Automation
EcoStruxure Automation Expert
Introduction to Modicon Switches
Altivar Machine Professional
MotionSizer for PacDrive 3
Power Management & Smart Grids
PowerLogic P5: Protection Engineering
EcoXpert Smart Grid
Eaton Low Voltage Switchgear
EcoStruxure Panel Server
Data Center & Building Management
Foundations of Modern Data Center Physical Infrastructure Management
EBO 2024: Advanced Engineering
EcoStruxure Building: Prescription - Mechanical & Control
Data Low & Management
EcoStruxure Building: Physical Infrastructure
EBO 2024: Advanced Server
EcoStruxure Building: Conntror
NotebookLM


The Raw Materials (II): A Digital & Emerging Tech Portfolio
Expertise extends into the digital frontier, integrating foundational IT skills with advanced concepts in AI, cyber-physical systems, and data architecture from a diverse range of platforms.
AI & Machine Learning
AI Fluency
Master's Program in Artificial Intelligence and Machine Learning for Software Engineering
Cyber-Physical Systems & IoT
Advanced Cyber-Physical Systems in Telecommunications
Edge Computing in Modern Power and Energy Systems
Masters in Cyber-Physical Systems and Information Technology
Data, Cloud & Cybersecurity
Data Processing and Hosting Services in Computer Engineering
Advanced Cybersecurity in Bibliotechnology
Masters in Cryptocurrency and Blockchain Applications
Azure DevOps
Advanced Cyber-Physical Systems in Telecommunications
Master's Program in Artificial Intelligence and Machine Learning for Software Engineering
Advanced Studies in Autonomous Vehicles and Drones for Electric Vehicle Engineering
Specialist Engineering in Intrastructure and Contractors: Electrochemical Engineering
Energy Storage and Battery Technology
Advanced Robotic Process Automation in Electricical Engineering
Master's in Artificial General Intelligence and Social Sciences
02/06/2025
download
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The System's Logic: Engineering with Logigrammes & Algorigrammes

To manage and integrate this vast knowledge base, a bespoke system was developed using procedural logic. This is the 'source code' that connects every credential, project, and skill into a unified, queryable database.

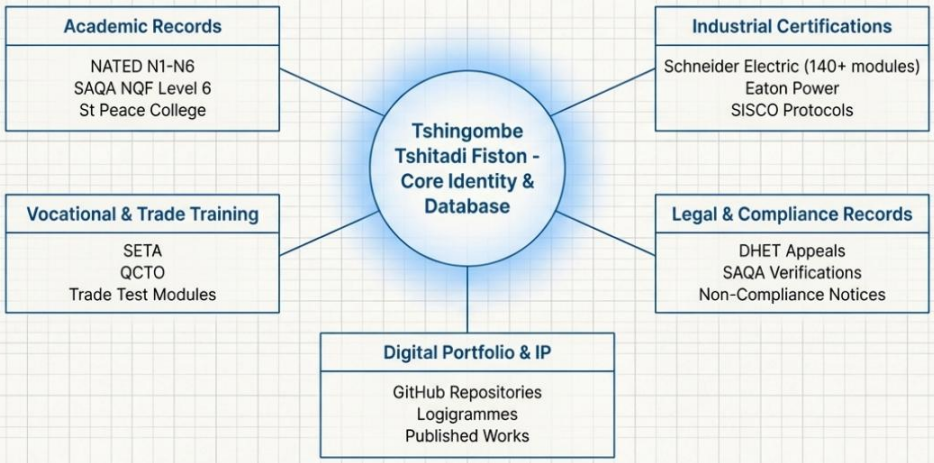
```
' === KfrmArchiveIPValidator ===
Private Sub cmdValidateMetadata_Click()
  If txtTitle.Text = "" Or txtDepot.Text = "" Then
     MsgBox "Please complete all metadata fields.", vbExclamation
  Else
     lblStatus.Caption = "Metadata validated for: " & txtTitle.Text
     MsgBox "Ready for archive and publication sync.", vbInformation
  End If
End Sub
```

Annotation: This isn't just code; it's a procedural method for mapping, validating, and connecting disparate records into a coherent whole.

NotebookLM

The Architecture in Practice: A Modular Framework

The system organizes a lifetime of learning into a modular, hub-and-spoke architecture. Each module represents a core facet of professional identity, interconnected and managed from a central database.



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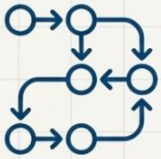
Ensuring Integrity: Verification, Security & Compliance

The architecture is built for trust. It integrates with official verification channels and incorporates modern digital credentialing technologies to ensure every qualification is authentic, auditable, and secure.

Official Verification

Integrates with SAQA VeriSearch and the National Learners' Records Database (NLRD) for authenticity checks.



Audit Traceability

Every record contains metadata including Qualification ID, NQF level, provider registration, and unique certificate numbers for a complete audit trail.

Enhanced Security

Employs security features like QR codes for instant verification and explores the adoption of blockchain and digital credentialing for tamper-proof records.

Compliance Framework

Designed to meet the requirements of SAQA, QCTO, and CHE.

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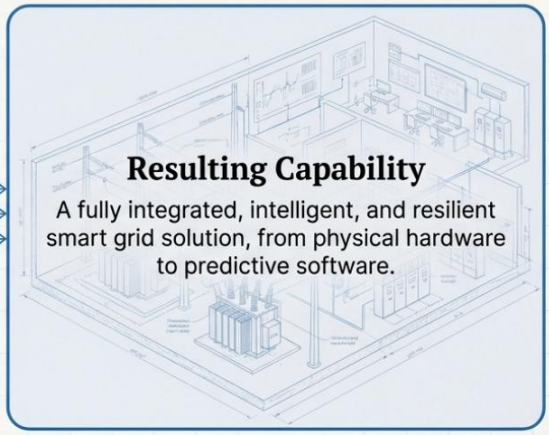
Output in Action: Designing the Smart Substation

An Integrated Architect can design, deploy, and manage a next-generation electrical substation by synthesizing knowledge from previously siloed domains.

Module 1: Power Systems
- Eaton LV Switchgear
- Schneider EcoStruxure Power

Module 2: Network & Control
- EcoXpert Smart Grid
- Cisco Network Protocols

Module 3: Data & AI
- AI for Predictive Maintenance (from AI Fluency)
- Data Analysis



Resulting Capability

A fully integrated, intelligent, and resilient smart grid solution, from physical hardware to predictive software.

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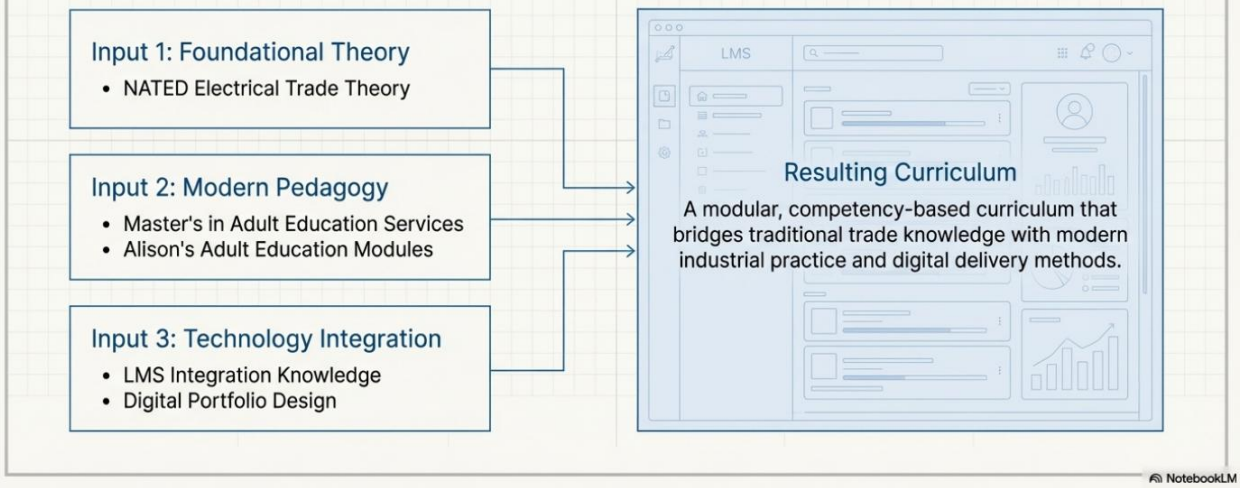
Output in Action: Architecting the TVET Curriculum of the Future

The same integrated framework can be used to design holistic, industry-aligned learning pathways for the next generation of technicians and engineers.


Input 1: Foundational Theory
• NATED Electrical Trade Theory
Input 2: Modern Pedagogy
• Master's in Adult Education Services
• Alison's Adult Education Modules
Input 3: Technology Integration
• LMS Integration Knowledge
• Digital Portfolio Design
LMS
Resulting Curriculum
A modular, competency-based curriculum that bridges traditional trade knowledge with modern industrial practice and digital delivery methods.
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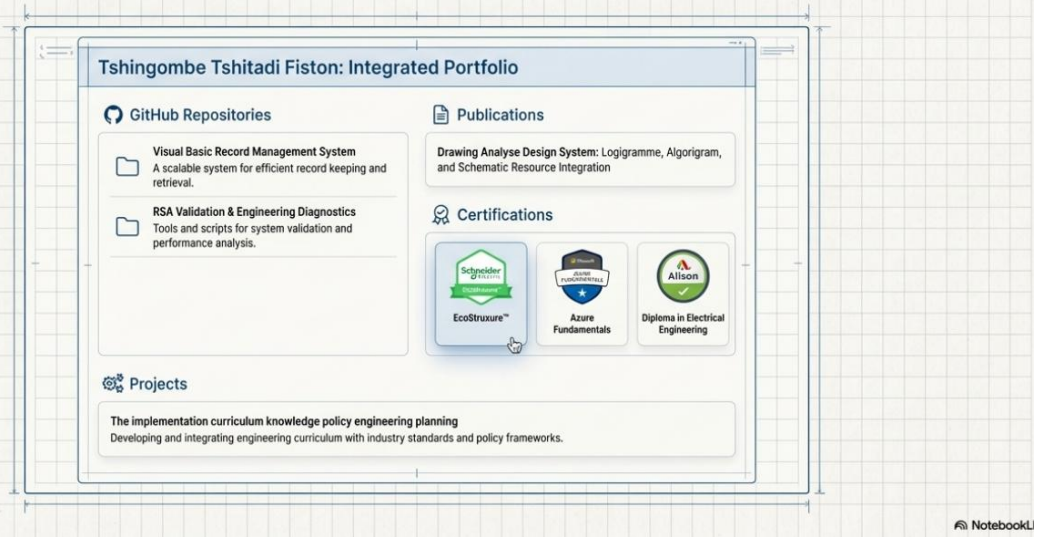
The System"s Output Is a Verifiable Ecosystem of Capability

The result is not a static resume. It is a living digital portfolio—a dynamic, verifiable ecosystem where every project, publication, and credential is interconnected and accessible.


Tshingombe Tshitadi Fiston: Integrated Portfolio
GitHub Repositories
Visual Basic Record Management System
A scalable system for efficient record keeping and retrieval.
RSA Validation & Engineering Diagnostics
Tools and scripts for system validation and performance analysis.
Publications
Drawing Analyse Design System: Logigramme, Algorigram, and Schematic Resource Integration
Certifications
EcoStruxure™
Azure Fundamentals
Diploma in Electrical Engineering
Projects
The implementation curriculum knowledge policy engineering planning
Developing and integrating engineering curriculum with industry standards and policy frameworks.
NotebookL

The Value Proposition: **The Integrated Architect**

A new professional archetype for the age of complexity.

Sees the System, Not Just the Parts

Connects disparate technologies and disciplines to design holistic solutions.

Bridges Theory and Practice

Translates NATED-level trade theory into practical applications using platforms like Schneider EcoStruxure and Eaton Power Systems.

Unifies Hardware and Software

Combines deep knowledge of physical electrical components with the ability to design and build custom software systems (VBA, Logigrammes) for management and automation.

Designs Resilient Solutions

Builds robust systems—technical and pedagogical—for complex, multi-domain challenges.

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Tshingombe Tshitadi Fiston

National N Diploma: Electrical Engineering | Certified Systems Integrator

Contact Information

Email: tshingombefiston@gmail.com
LinkedIn: linkedin.com/in/tshingombe-fiston
Digital Portfolio: portfolio.tshingombe.com

Verifiable IDs

Microsoft ID: 9953174
Schneider ID: 607069d9-fa26-423a-9d8c-d810df173a87

Ready to design the future.

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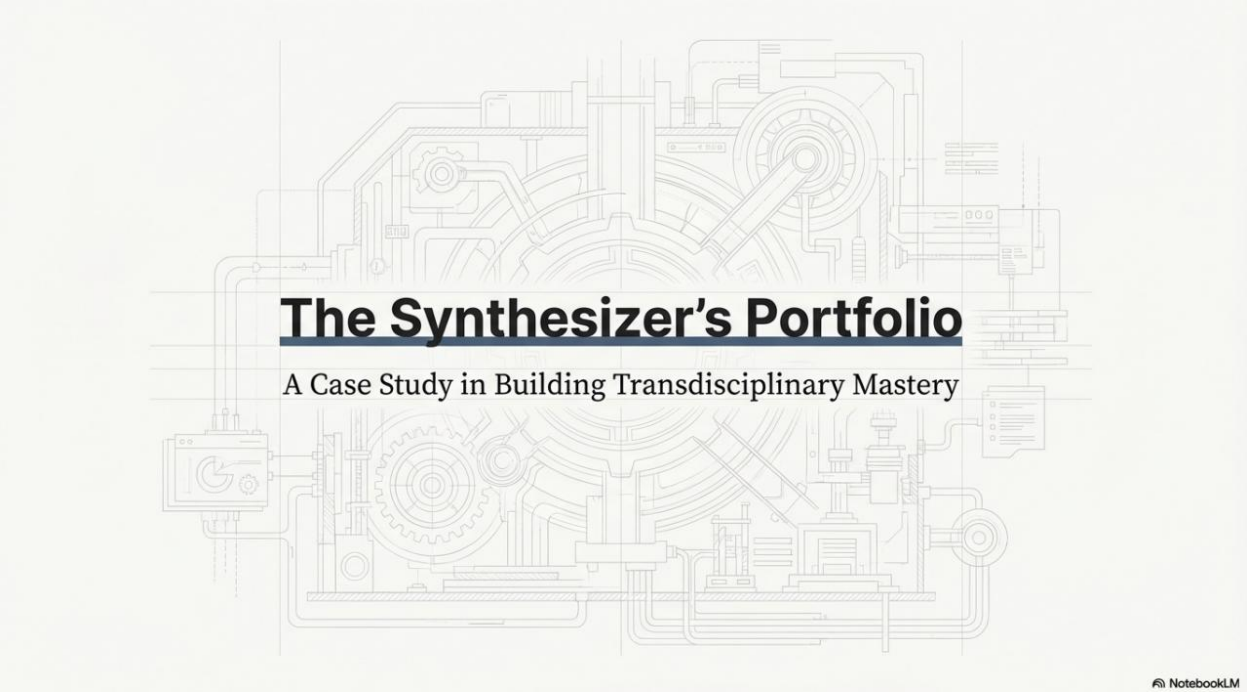
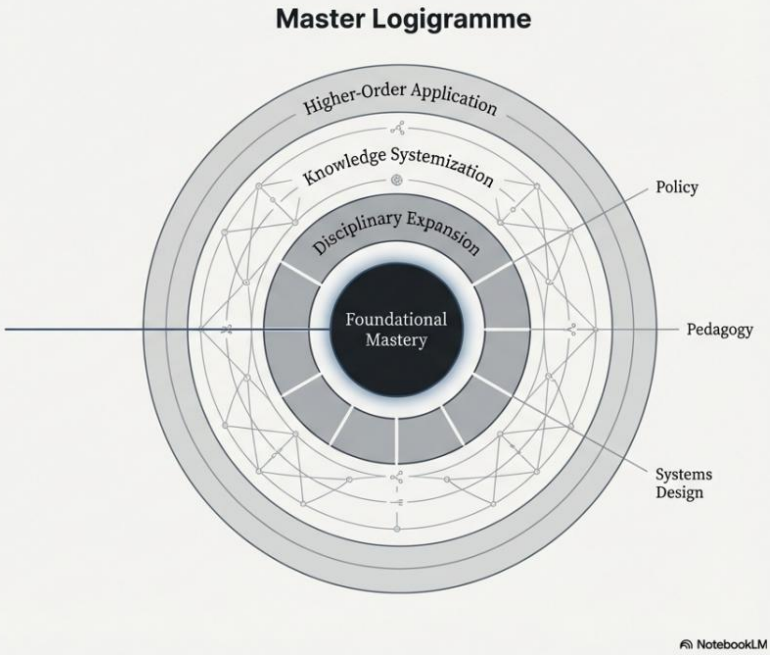

The Synthesizer's Portfolio
A Case Study in Building Transdisciplinary Mastery
NotebookLM

The Modern Challenge Demands Integrated Expertise

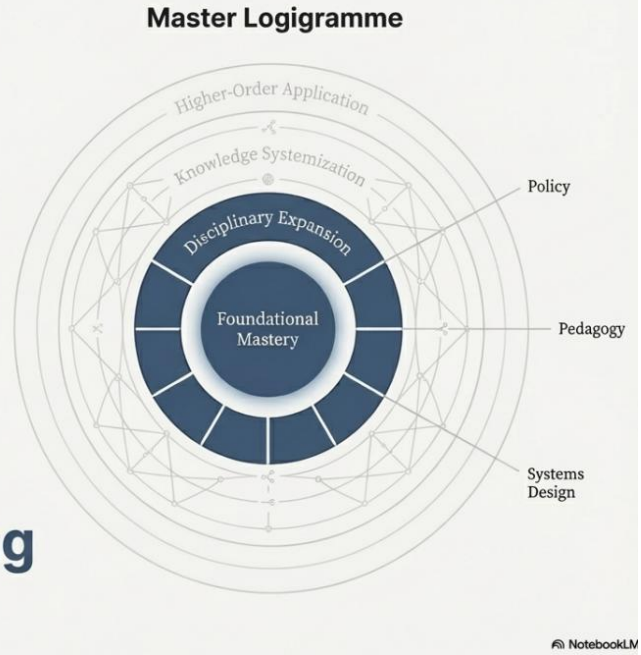
Traditional, siloed learning pathways are insufficient for solving today's complex, interconnected problems. True mastery requires the ability to synthesize knowledge across diverse domains—from foundational engineering to future-focused technologies and systemic policy.

This portfolio is structured as a case study in building that capability, progressing through four distinct but integrated stages of mastery.



Module I: Establishing a Foundation of Technical Mastery

The journey begins with deep, accredited expertise in a core domain: Electrical Engineering. This provides the theoretical and practical bedrock for all subsequent learning and synthesis. Every advanced concept is anchored to these fundamental principles.



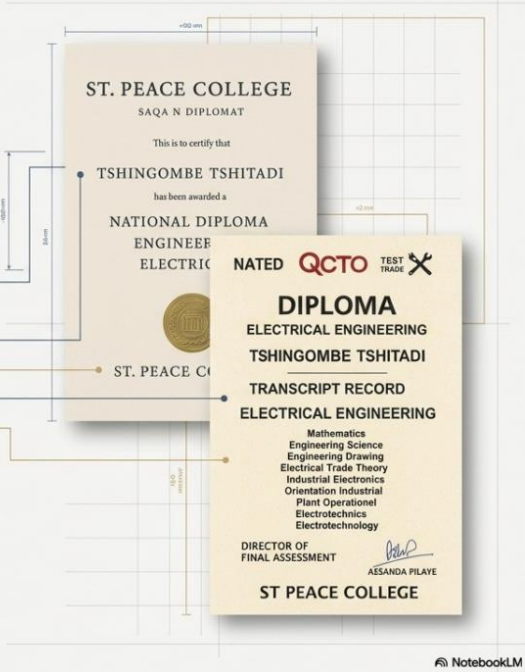
National N Diploma: Electrical Engineering

Evidence: The National N Diploma (NQF Level 6)

A comprehensive qualification awarded by St. Peace College and accredited under the South African Qualifications Authority (SAQA) framework.

- **Qualification Title:** National N Diploma: Engineering Studies (Electrical Engineering)
- **SAQA QUAL ID:** 66994 / 90674
- **NQF Level:** 6
- **Total Credits:** 360
- **Core Subjects:** Mathematics, Engineering Science, Electrical Trade Theory, Industrial Electronics, Electrotechnics, Plant Operation.

This demonstrates mastery over fundamental engineering principles, validated against rigorous national standards and requiring 24 months of practical experience.



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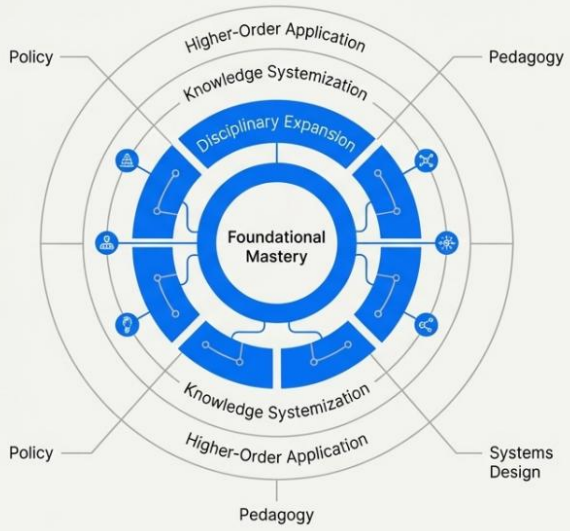
Module II: Expansion Across Future-Focused Disciplines

Building upon the engineering foundation, this phase involved a multi-platform, self-directed curriculum focused on the technologies shaping the future of industry: industrial automation, sustainable energy, advanced cybersecurity, and artificial intelligence.

140+
active courses on a single corporate platform.

Master Logigramme



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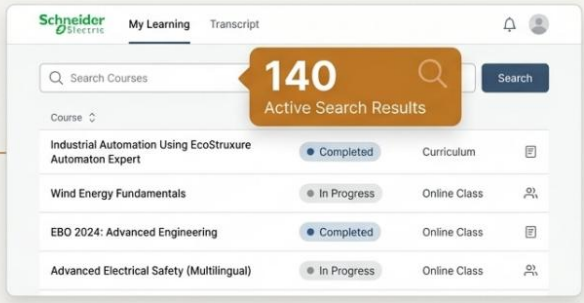
Evidence: Mastering Industrial Automation & Energy Management

An extensive, ongoing training transcript with Schneider Electric, focusing on their EcoStruxure platform, power systems, and industrial automation.

Key Training Curricula

- **Automation:** Industrial Automation Using EcoStruxure, Altivar Machine Professional, Modicon Switches.
- **Power & Energy:** PowerLogic P5: Protection Engineering, Wind Energy Fundamentals, Professional Energy Manager LearningPath.
- **Cybersecurity & Safety:** Advanced Electrical Safety, How to Perform a Security Code Review.

14.15 HRS
Aggregate Training Completed
(Fiscal Year End 12/31/2025)



So What? *"This demonstrates proficiency in proprietary, industry-leading technologies for automation, grid management, and operational security."*

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Evidence: Proliferation of Skills Across Digital Platforms

A curated selection of advanced courses and diplomas completed across platforms like Alison and AIU, organized into strategic capability clusters.

Cluster 1: AI & Intelligent Systems

- Master's in Artificial General Intelligence
- Master's Program in AI and Machine Learning for Software Engineering

Cluster 2: Cyber-Physical & Edge Computing

- Advanced Cyber-Physical Systems in Telecommunications
- Edge Computing in Modern Power and Energy Systems

Cluster 3: Blockchain & DLT

- Masters in Cryptocurrency and Blockchain Applications
- Masters in Distributed-Ledger Technology Applications in Educational Technology

Cluster 4: Renewable Energy & Sustainability

- Clean Energy Technology
- Energy Storage and Battery Technology

So What? "This illustrates a proactive and systematic approach to acquiring expertise in disruptive technologies, ensuring relevance and future-readiness."

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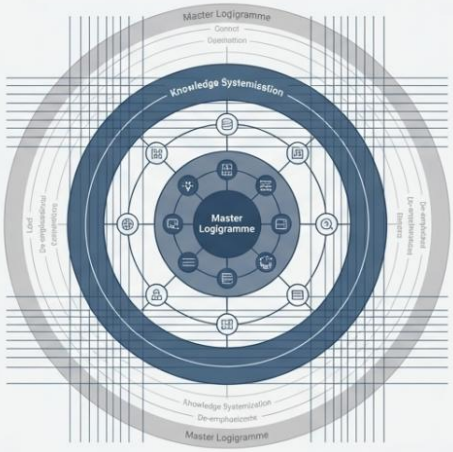
Module III: Systemization of Knowledge

Acquiring knowledge is only the first step. The real challenge is to manage, connect, and operationalize it. This phase focuses on building custom systems and frameworks to transform a vast repository of information into an integrated, queryable, and actionable knowledge base.



Key Concepts Introduced

Logigramme, Algorigramme, Visual Basic for Applications (VBA).

Logigramme, Algorigramme, Visual Basic for Applications (VBA).

NotebookLM

Evidence: Engineering a Personal Knowledge Management System

To manage the complexity of this multi-domain portfolio, a custom record management system was designed and implemented using Visual Basic for Applications (VBA). This system uses logical frameworks to track, validate, and connect every piece of evidence.

Logigramme (Workflow Logic)

Defines the high-level decision flow for processing new records, from academic transcripts to legal documents and technical modules.

Algorigramme (Procedural Logic)

Implements the decision flow in code, automating the sorting and routing of evidence. Example logic:

```
Select Case recordType
    Case "Academic": Call ValidateTranscript()
    Case "Technical": Call MapToEngineeringModule()
    Case "Legal": Call RouteToLegalBody()
End Select
```

So What? "This demonstrates a rare, meta-level skill: the ability to architect systems for managing complexity and creating a coherent whole from disparate parts."

NotebookLM

Application: A Self-Designed Credential & Cost Ledger

The system generates a modular record book that tracks credentials, costs, and compliance data, creating a fully auditable and portable portfolio.

Date	Institution	Item/ Module	Sale Price	Amen- dment	Final Cost	Award	Library Usage	Booking	Notes
2025-10-08	CPS Institute	CPS Architecture & IoT Lab	R1,500	-R400	R1,100	Certificate – CPS Integration	4h	Sensor Workshop (2h)	GitHub + SAQA/NQF

Tracked Metadata Includes

- Costs & Amendments (grants, subsidies)
- Awards & Recognitions
- Library & Bibliotech Usage
- Bookings for Labs & Diagnostics
- SAQA/NQF Mapping
- Export Targets (GitHub, LMS, Archive.org)

So What? "This transforms a collection of certificates into a dynamic, **data-driven asset for audit, compliance, and strategic career planning.**" ✍️

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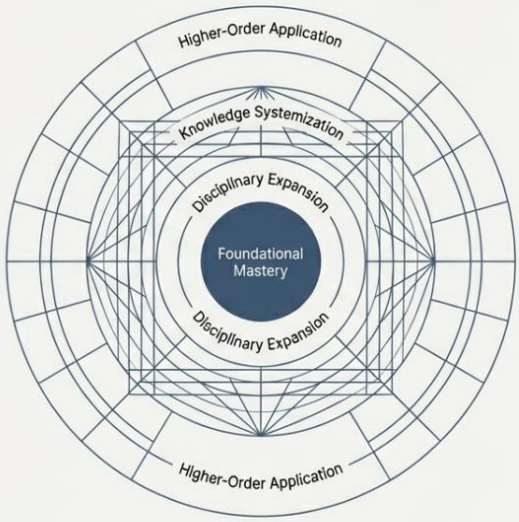
Module IV: Application to Higher-Order Systems

The ultimate purpose of synthesized knowledge is its application. This final phase demonstrates the use of the integrated skill set to design educational curricula, navigate complex regulatory frameworks, and contribute to systemic improvements in technical and professional domains.



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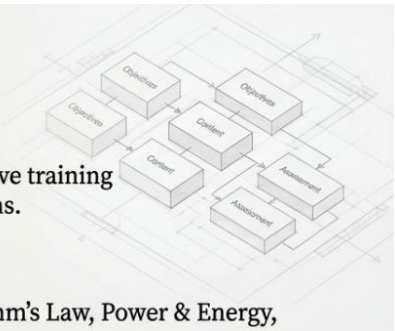
Evidence: Designing and Structuring Technical Curricula



Leveraging deep technical knowledge to architect and outline comprehensive training modules suitable for TVET colleges, corporate training, and online platforms.

Examples of Curriculum Development

- **Electrical Engineering Fundamentals:** Modular framework covering Ohm's Law, Power & Energy, DC/AC circuits, and communication engineering.
- **Safety & Compliance:** Modules on Electrical Safety, Chemical Management, and OHSA statutory requirements, mapped to SAQA descriptors.
- **Didactic Integration:** Development of lesson plans, assessment rubrics, moderation templates, and career matrices aligned to SAQA exit level outcomes.
- **LMS Strategy:** Design of Learning Management System (LMS) integration, including self-enrollment guides and credential showcasing.

So What? *This demonstrates the ability to translate expert knowledge into effective learning experiences, a critical skill for leadership, mentorship, and institutional development.*

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Evidence: Mastering the Regulatory & Compliance Landscape

A core competency is the analysis and application of regulatory standards governing qualifications, electrical installations, and security services.

Demonstrated Expertise in:

- **SAQA/NQF Frameworks:** Detailed analysis of qualification types, NQF levels, total credits, security features (holograms, QR codes), and verification via the National Learners' Records Database (NLRD).
- **Electrical Compliance (SANS):** Voltage drop calculations, busbar current density (SANS 60439-1), circuit requirements, and disconnecting device protocols.
- **Private Security Regulation (PSIRA):** Understanding of the PSIRA Act 56 of 2000, grading, application requirements, and the code of conduct for security providers.

So What? *This proves an ability to operate not just within technical specifications, but within the broader legal and policy systems that ensure quality, safety, and accountability.*

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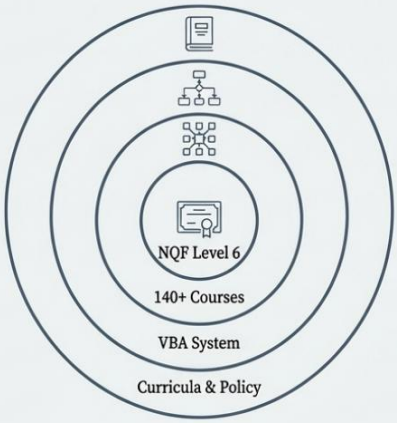
A Blueprint for Lifelong Synthesis

This portfolio documents a journey from foundational expertise to a self-architected system for continuous learning, synthesis, and application. It represents a deliberate methodology for building transdisciplinary mastery—a repeatable blueprint for navigating the future of work and education.



The Journey Recapped

1. **Foundation:** Anchored in a formal NQF Level 6 Engineering Diploma.
2. **Expansion:** Proliferated across 140+ courses in AI, automation, and energy.
3. **Systemization:** Architected a custom VBA system with logigrammes to manage complexity.
4. **Application:** Deployed expertise to design curricula and master regulatory policy.

NotebookLM

An Integrated Professional Identity

A portfolio of evidence unified under a verifiable digital identity across key national and global systems.

Microsoft **Microsoft ID:** 9953174

Schneider Electric **Schneider Electric ID:** 607069d9-fa26-423a-9d8c-d810df173a87

SARS **South African Revenue Service (SARS):** SF7478

South African Reserve Bank (SARB): ID 61095446

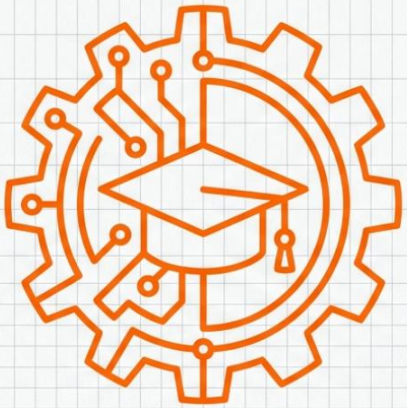
Central Supplier Database (CSD Treasury): R016921978

SETA **SETA LMS ID:** 127952

NotebookLM

Architecting the Future of Technical Education

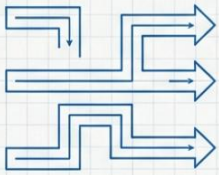
A Blueprint for an Integrated, Compliant, and Career-Aligned Qualification Framework



NotebookLM

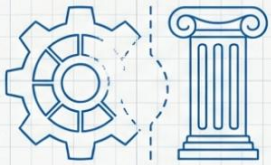
The Challenge: A Fragmented Educational Landscape

South Africa's technical and vocational education system is a complex ecosystem of siloed qualifications, disparate regulatory bodies, and a persistent gap between learning outcomes and industry needs.



Siloed Pathways

Learners navigate a maze of qualifications from different authorities (e.g., NATED N1-N6, National N Diplomas) with unclear progression and equivalence. Key regulatory bodies mentioned: **DHET**, **QCTO**, **CHE**.



Industry-Academia Disconnect

Theoretical knowledge is often divorced from the practical, hands-on competencies required by sectors like manufacturing (**MERSETA**), chemical industries (**CHIETA**), and ICT (**ISETT SETA**).

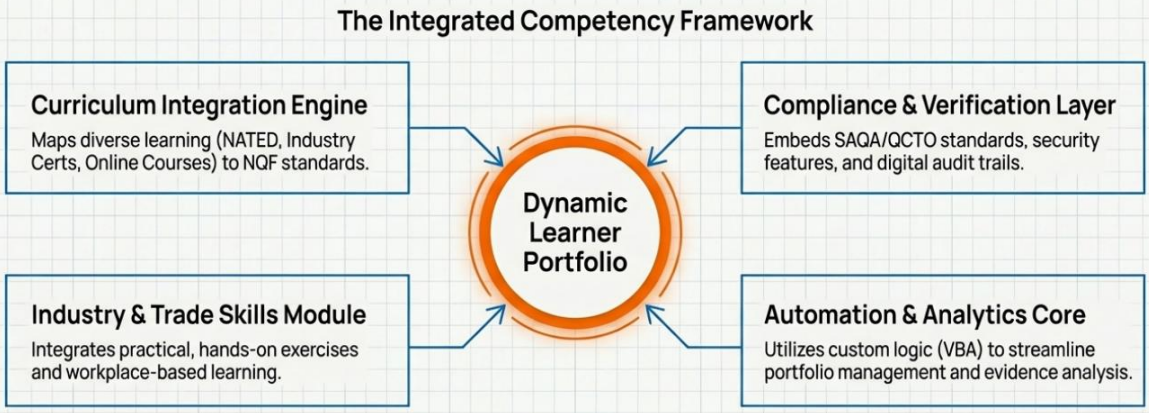
Credential Insecurity

The lack of a unified verification system creates risks of qualification fraud and makes it difficult for employers to validate skills, undermining the value of legitimate credentials.

NotebookLM

The Solution: An Integrated Competency Framework

We propose a holistic, digitally-native framework that unifies disparate educational streams into a single, verifiable, and dynamic portfolio of competence. This is the blueprint for transformation.


The Integrated Competency Framework
Curriculum Integration Engine
Maps diverse learning (NATED, Industry Certs, Online Courses) to NQF standards.
Compliance & Verification Layer
Embeds SAQA/QCTO standards, security features, and digital audit trails.
Dynamic Learner Portfolio
Industry & Trade Skills Module
Integrates practical, hands-on exercises and workplace-based learning.
Automation & Analytics Core
Utilizes custom logic (VBA) to streamline portfolio management and evidence analysis.

NotebookLM

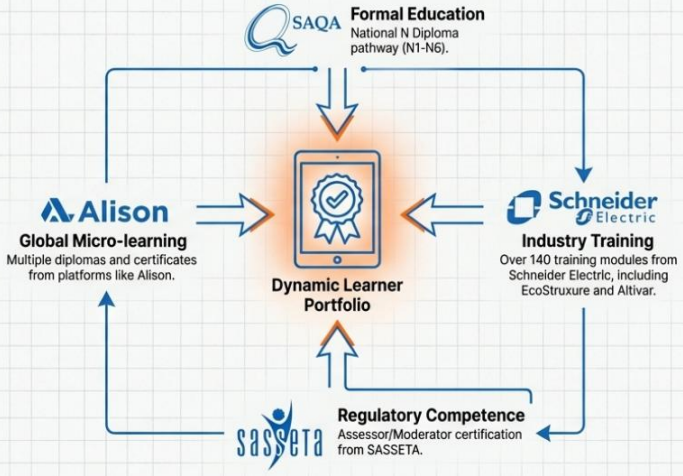
The Core Component: The Dynamic Learner Portfolio

The portfolio is the central nervous system of the framework. It's a verifiable, multi-source repository of a learner's lifelong journey, capturing everything from formal diplomas to industry micro-credentials and practical project work.

Case in Point: A Portfolio of Synthesis

The framework is prototyped through the extensive portfolio of Tshingombe Tshitadi, which integrates:

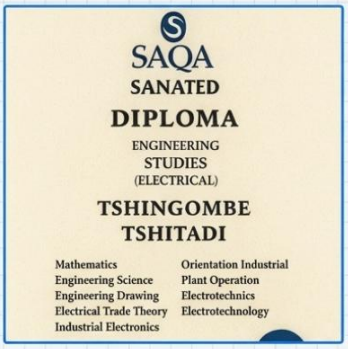
- **Formal Education**: National N Diploma pathway (N1-N6).
- **Industry Training**: Over 140 training modules from Schneider Electric, including EcoStruxure and Altivar.
- **Regulatory Competence:** Assessor/Moderator certification from SASSETA.
- **Global Micro-learning:** Multiple diplomas and certificates from platforms like Alison.



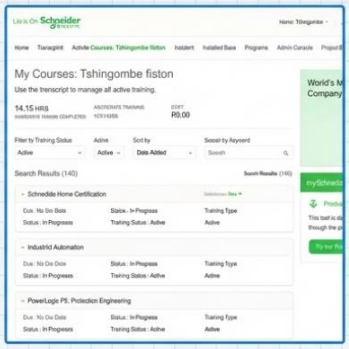
NotebookLM

Evidence in Action: Deconstructing a Competency Portfolio

The strength of the portfolio lies in its validated, multi-faceted evidence. Each artifact is a data point representing a specific competency, mapped against a recognized standard.



Formal National Qualification



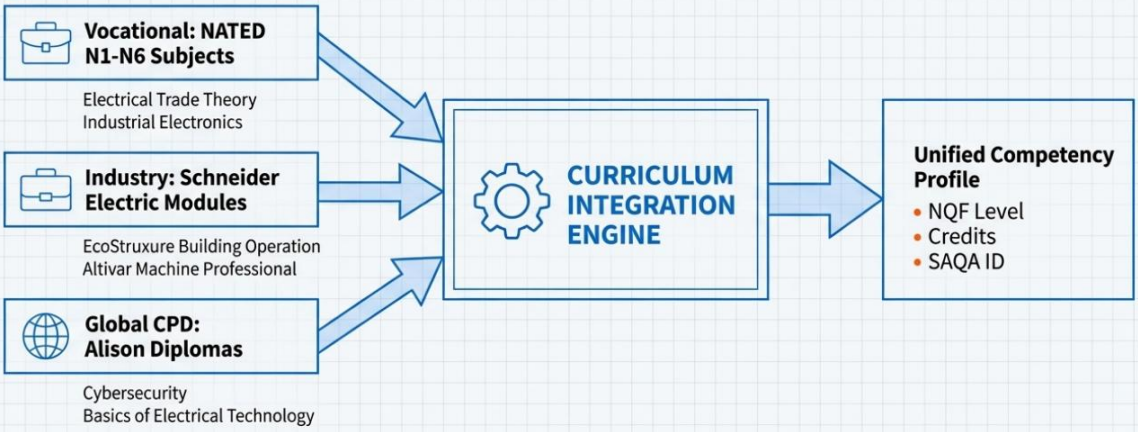
Industry-Specific Training

Regulatory & Skills-Based Certification

NotebookLM

The Engine: Mapping a World of Knowledge to a Single Standard

The framework's engine normalizes credentials from varied sources against South Africa's National Qualifications Framework (NQF). It translates industry training, practical skills, and international courses into a common language of levels, credits, and competencies.



NotebookLM

From Theory to Trade: Integrating Verifliable Practical Skills

The framework prioritizes evidence of applied skill. Detailed practical exercises, drawn from accredited trade manuals, are documented and assessed within the portfolio, providing proof of hands-on competence.

Exercise 4.1.168: Make a Printed Circuit Board for Power Supply

Objective: Transfer a circuit layout, etch tracks using $FeCl_3$, drill component holes, and prepare a functional PCB.

Evidence Artifacts

Photos of the board at each stage (layout transfer, etching, final product), instructor validation log.

Exercise 4.1.170: Troubleshoot Defects in Simple Power Supplies

Objective: Diagnose component-level faults using using logical troubleshooting and measurement tools.

Evidence Artifacts

Diagnostic report, CRO screenshots, log of measurements taken.

NotebookLM

The Compliance Layer: Engineering Trust and Verifiability

Every credential and competency within the framework is anchored in national regulatory standards. The system is designed for auditability, security, and seamless verification by employers and institutions.

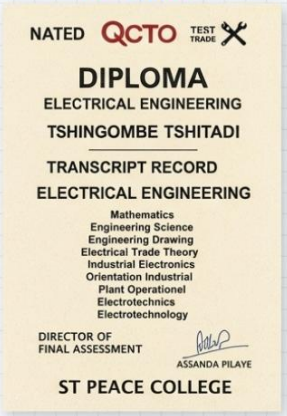
- **Regulatory Alignment:** Explicit mapping to SAQA, QCTO, and DHET policies, including NQF Levels and Credit Values.
- **Digital Verification:** Integration with national databases like SAQA's VeriSearch and the National Learners' Records Database (NLRD) for instant authentication.
- **Secure Credentialing:** Implementation of anti-fraud features on all generated certificates.
- **Legal Foundation:** Adherence to foundational laws like the Merchandise Marks Act and Copyright Act for the use of official symbols.

NotebookLM

Redesigning the Credential: From Static Paper to Dynamic Proof

The framework reimagines the traditional certificate as a secure, data-rich document that is both human-readable and machine-verifiable.

BEFORE



AFTER

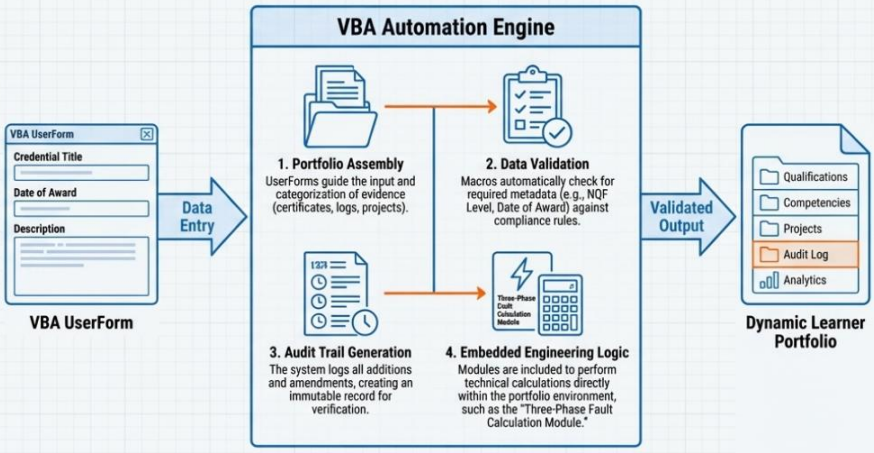
NotebookLM

The Automation Core: A VBA System for Portfolio Management

To manage the complexity of a rich, multi-source portfolio, a custom VBA (Visual Basic for Applications) macro and **form control system** has been developed. It automates critical administrative and analytical tasks.

System Capabilities

1. **Portfolio Assembly:** UserForms guide the input and categorization of evidence (certificates, logs, projects).
2. **Data Validation:** Macros automatically check for required metadata (e.g., NQF Level, Date of Award) against compliance rules.
3. **Audit Trail Generation:** The system logs all additions and amendments, creating an immutable record for verification.
4. **Embedded Engineering Logic:** Modules are included to perform technical calculations directly within the portfolio environment, such as the "Three-Phase Fault Calculation Module."

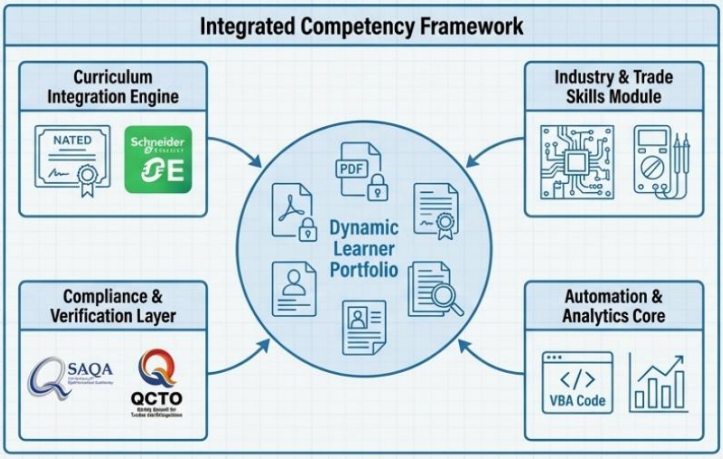

VBA UserForm
Credential Title
Date of Award
Description
VBA UserForm
Data Entry
VBA Automation Engine
1. Portfolio Assembly
UserForms guide the input and categorization of evidence (certificates, logs, projects).
2. Data Validation
Macros automatically check for required metadata (e.g., NQF Level, Date of Award) against compliance rules.
3. Audit Trail Generation
The system logs all additions and amendments, creating an immutable record for verification.
4. Embedded Engineering Logic
Modules are included to perform technical calculations directly within the portfolio environment, such as the "Three-Phase Fault Calculation Module."
Validated Output
Qualifications
Competencies
Projects
Audit Log
Analytics
Dynamic Learner Portfolio

NotebookLM

Proof of Concept: A Unified Engineering Dossier

The portfolio of Tshingombe Tshitadi serves as a complete, functional prototype of the Integrated Competency Framework. It is not merely a collection of documents, but a live demonstration of a system that successfully integrates:

- **Multi-Authority Qualifications**: From NATED and SASSETA.
- **Deep Industry Expertise**: From Schneider Electric and Eaton.
- **Rigorous Practical Skills**: From NSQF-aligned trade manuals.
- **Robust Compliance**: With SAQA NQF standards.
- **Systemic Automation**: Through a custom VBA engine.



NotebookLM

A Scalable Model for National Transformation

This blueprint is designed for adoption by TVET colleges, Sector Education and Training Authorities (SETAs), and national regulators. It offers a clear path to a more coherent, credible, and agile technical education system.

For Learners

- Provides clear pathways, recognizes all forms of learning (RPL), and creates a portable, verifiable record of competence.

For Industry

- Delivers graduates with proven, relevant skills and simplifies the credential verification process, reducing hiring risk.

For Institutions

- Offers a framework for curriculum modernization, improves auditability, and fosters closer ties with industry partners like City Power and Eskom.

For Regulators

- Enhances the integrity of the NQF, combats credential fraud, and provides richer data on skills development.

NotebookLM

The Pathway to Implementation

Moving this blueprint from prototype to national standard requires a collaborative, phased approach.

1 Institutional Pilot Program

Partner with a select group of TVET colleges and industry training providers (e.g., St Peace College, City Power) to implement the framework for a specific trade, like Electrical Engineering.

2 Digital Platform Development

Scale the VBA prototype into a secure, web-based portfolio platform accessible to learners, educators, and employers.

3 Regulatory Sandbox

Work with SAQA and QCTO to formally recognize the integrated portfolio as a valid mechanism for qualification award and Recognition of Prior Learning (RPL).

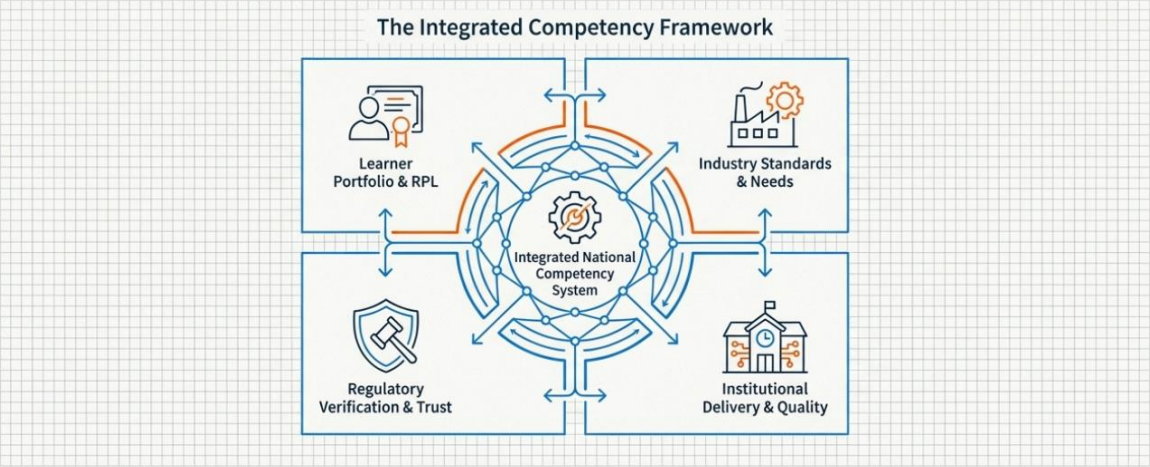
4 Establish a Steering Committee

Form a working group of representatives from DHET, industry, and educational institutions to guide the national rollout.

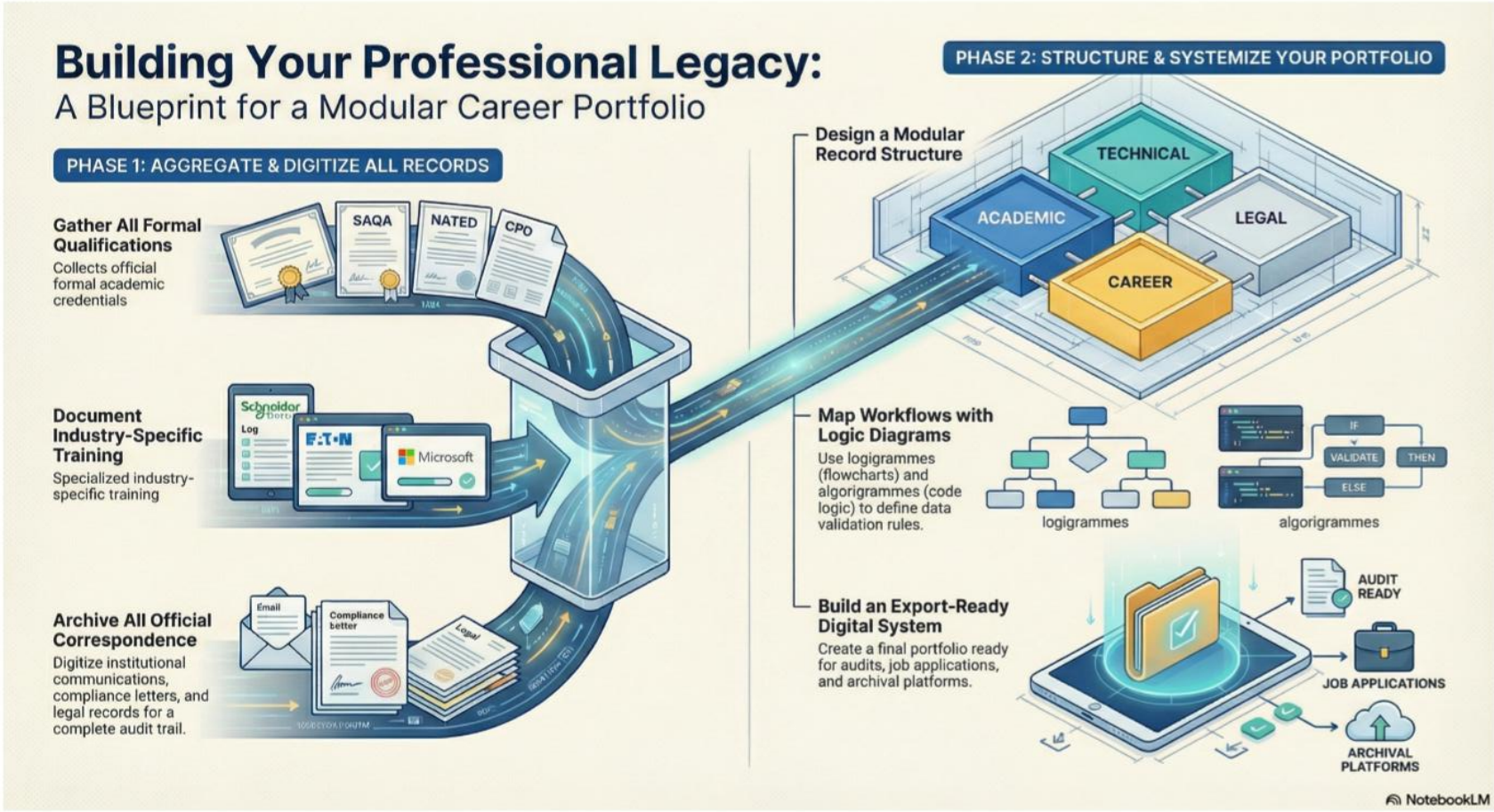
NotebookLM

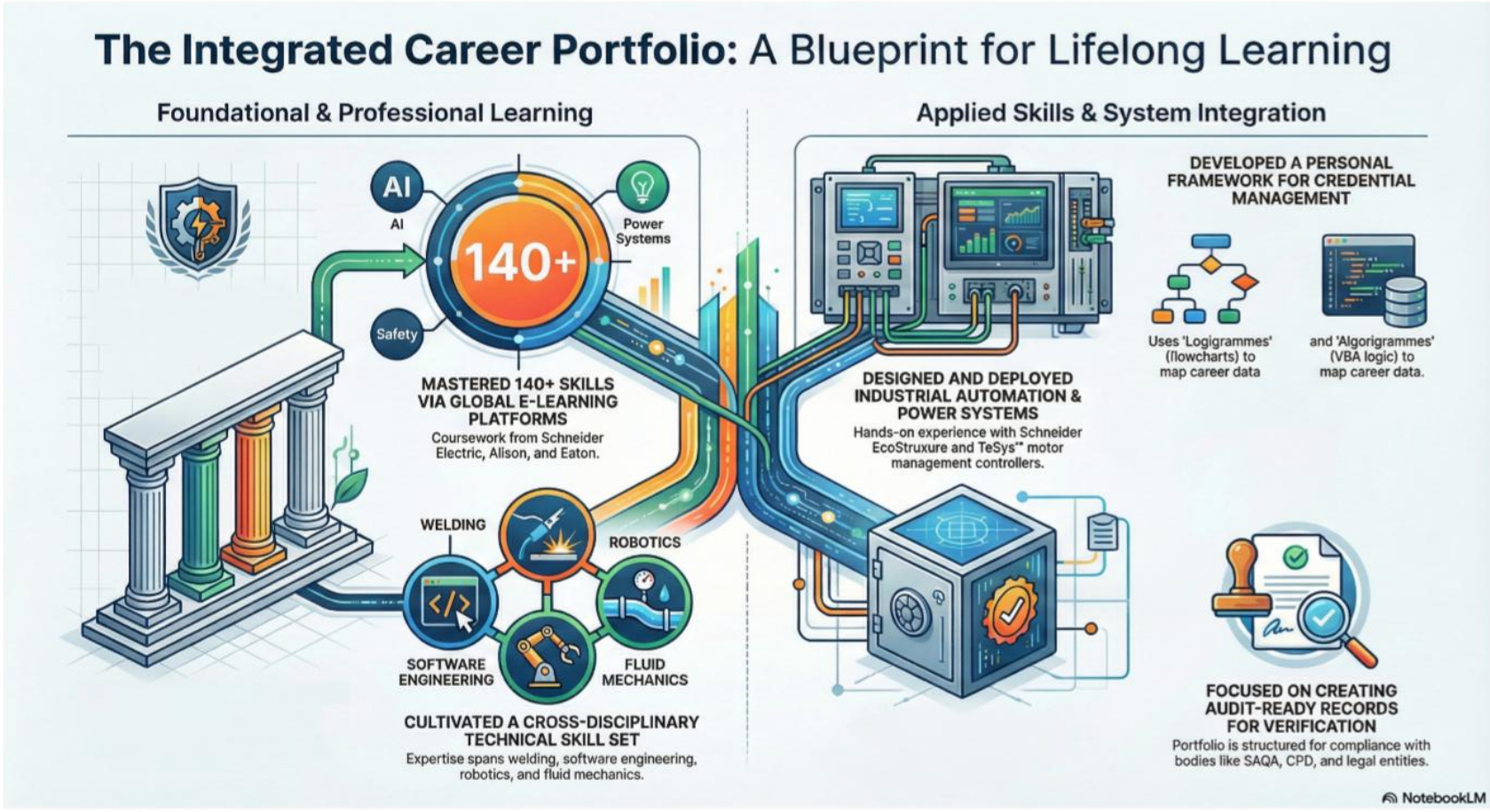
The Blueprint Exists.

An integrated, secure, and industry-aligned future for technical education is not a theoretical goal. It has been designed, prototyped, and validated.


The Integrated Competency Framework
Learner Portfolio & RPL
Industry Standards & Needs
Integrated National Competency System
Regulatory Verification & Trust
Institutional Delivery & Quality

NotebookLM


Building Your Professional Legacy:
A Blueprint for a Modular Career Portfolio
PHASE 1: AGGREGATE & DIGITIZE ALL RECORDS
Gather All Formal Qualifications
Collects official formal academic credentials
SAQA
NATED
CPD
Document Industry-Specific Training
Specialized industry-specific training
Schneider Electric
Log
EATON
Microsoft
Archive All Official Correspondence
Digitize institutional communications, compliance letters, and legal records for a complete audit trail.
Email
Compliance letter
Legal
PHASE 2: STRUCTURE & SYSTEMIZE YOUR PORTFOLIO
Design a Modular Record Structure
TECHNICAL
ACADEMIC
LEGAL
CAREER
Map Workflows with Logic Diagrams
Use logigrammes (flowcharts) and algorigrammes (code logic) to define data validation rules.
logigrammes
IF
VALIDATE
THEN
ELSE
algorigrammes
Build an Export-Ready Digital System
Create a final portfolio ready for audits, job applications, and archival platforms.
AUDIT READY
JOB APPLICATIONS
ARCHIVAL PLATFORMS
NotebookLM


The Integrated Career Portfolio: A Blueprint for Lifelong Learning
Foundational & Professional Learning
Applied Skills & System Integration
AI
Power Systems
Safety
140+
MASTERED 140+ SKILLS VIA GLOBAL E-LEARNING PLATFORMS
Coursework from Schneider Electric, Alison, and Eaton.
WELDING
ROBOTICS
SOFTWARE ENGINEERING
FLUID MECHANICS
CULTIVATED A CROSS-DISCIPLINARY TECHNICAL SKILL SET
Expertise spans welding, software engineering, robotics, and fluid mechanics.
DESIGNED AND DEPLOYED INDUSTRIAL AUTOMATION & POWER SYSTEMS
Hands-on experience with Schneider EcoStruxure and TeSys™ motor management controllers.
DEVELOPED A PERSONAL FRAMEWORK FOR CREDENTIAL MANAGEMENT
Uses 'Logigrammes' (flowcharts) to map career data
and 'Algorigrammes' (VBA logic) to map career data.
FOCUSED ON CREATING AUDIT-READY RECORDS FOR VERIFICATION
Portfolio is structured for compliance with bodies like SAQA, CPD, and legal entities.
NotebookLM

Engineering a Career: A Blueprint for Lifelong Learning & Curriculum Design

THE FOUNDATION: ACQUIRING MULTIDISCIPLINARY EXPERTISE

Mastery of Core Electrical & Mechanical Engineering

Deep knowledge in DC/AC circuits, transformers, thermodynamics, and electrical machines.

Specialization in Safety, Risk & Compliance

Expertise in Occupational Health & Safety (OHSA), fire science, and SANS/IEC standards.

Proficiency in Modern Digital & Automation Systems

Competence in industrial automation, cybersecurity, computer networking, and power systems.

THE APPLICATION: BUILDING AN EDUCATIONAL FRAMEWORK

Developing Practical Career & Assessment Tools

Building resources like resume builders, diagnostic simulations, and trade test preparation materials.

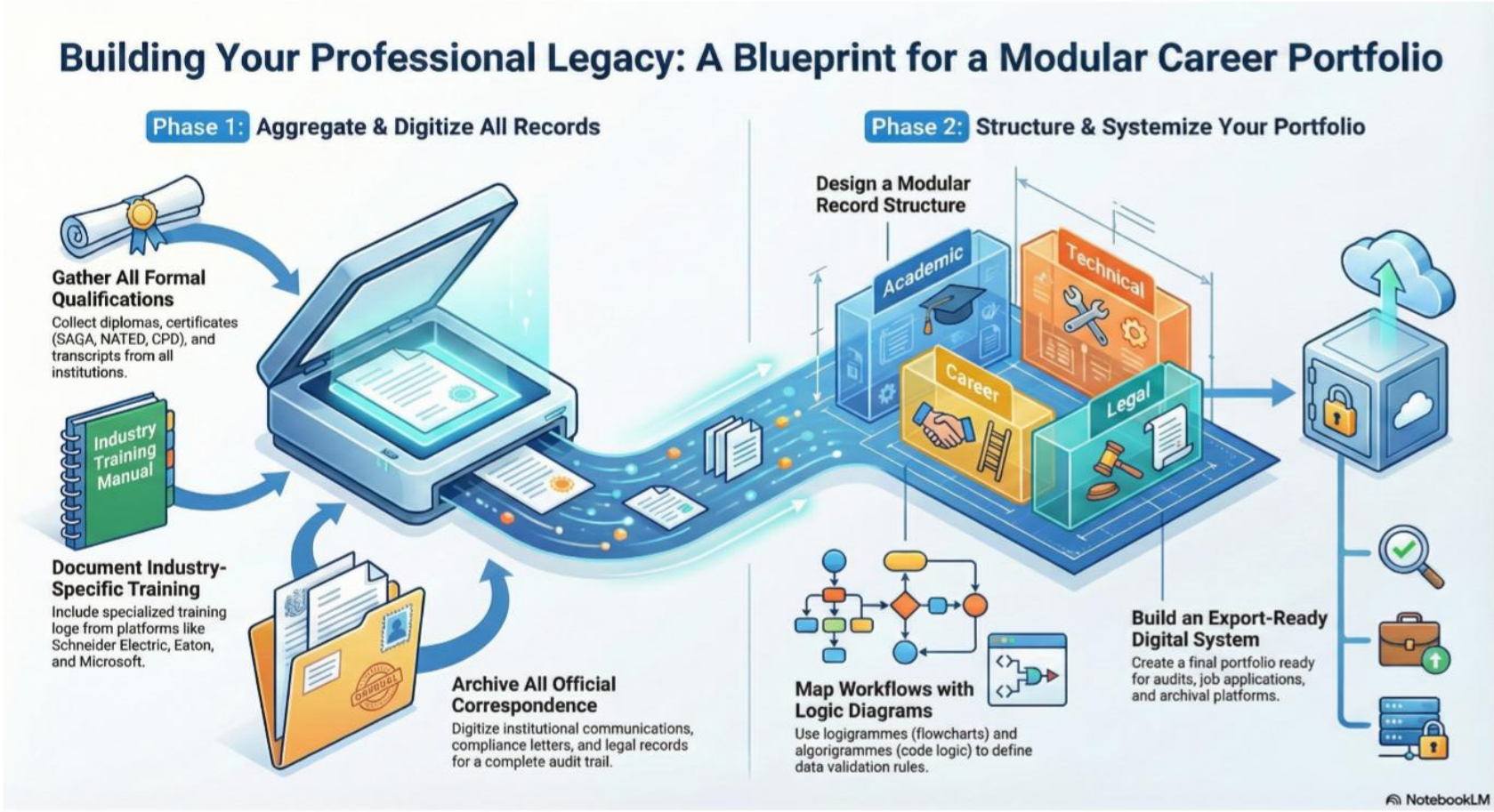
Designing Modular, "LMS-Ready" Curriculum

Creating structured courses with clear learning outcomes, assessments, and portfolio tasks.

Aligning with National Qualification Standards

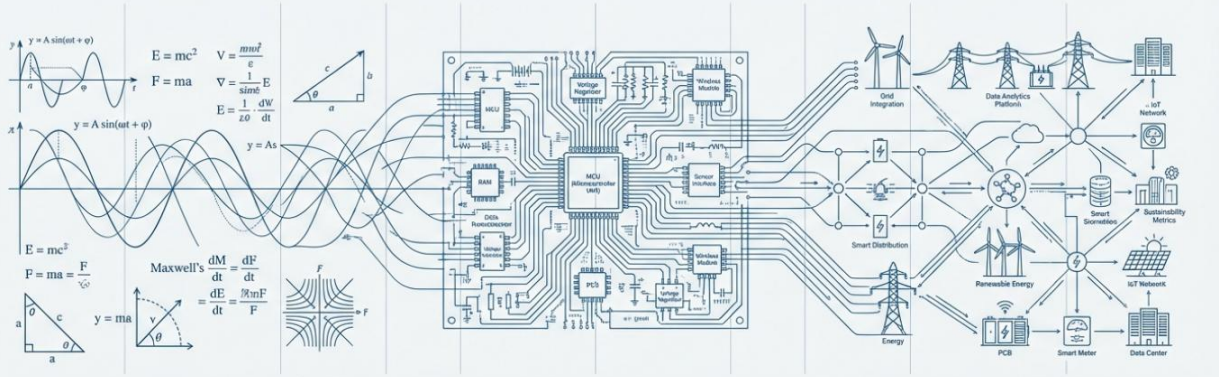
Systematically mapping all curriculum to SAQA, NGF, and TVET frameworks for recognition.

NotebookLM


Building Your Professional Legacy: A Blueprint for a Modular Career Portfolio
Phase 1: Aggregate & Digitize All Records
Phase 2: Structure & Systemize Your Portfolio
Gather All Formal Qualifications
Collect diplomas, certificates (SAGA, NATED, CPD), and transcripts from all institutions.
Industry Training Manual
Document Industry-Specific Training
Include specialized training loge from platforms like Schneider Electric, Eaton, and Microsoft.
Archive All Official Correspondence
Digitize institutional communications, compliance letters, and legal records for a complete audit trail.
Design a Modular Record Structure
Academic
Technical
Career
Legal
Map Workflows with Logic Diagrams
Use logigrammes (flowcharts) and algorigrammes (code logic) to define data validation rules.
Build an Export-Ready Digital System
Create a final portfolio ready for audits, job applications, and archival platforms.
NotebookLM

Forging an Engineer: A Journey from Core Principles to Systemic Innovation

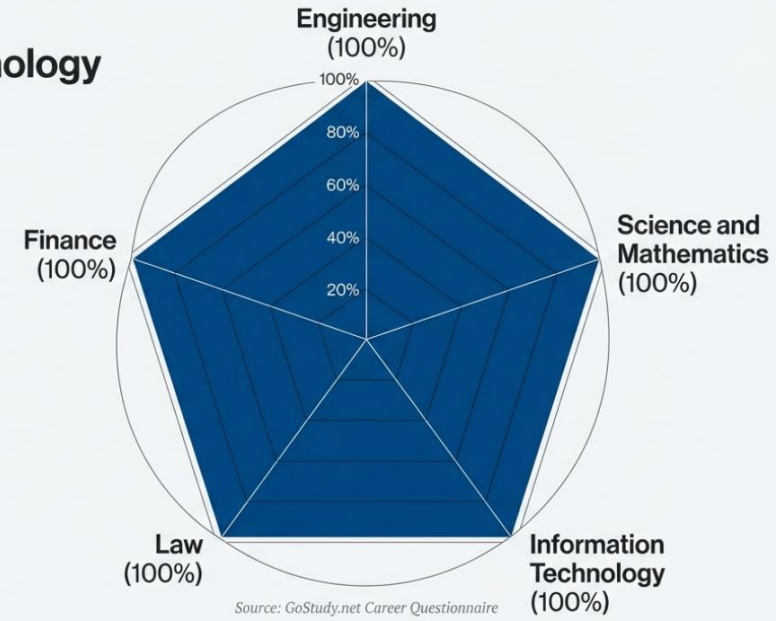
The Portfolio of Fiston Tshingombe Tshitadi



NotebookLM

An Innate Aptitude for Engineering and Technology

A successful engineering career begins with a natural inclination towards analytical and technical fields, as validated by objective career assessment.



Source: GoStudy.net Career Questionnaire

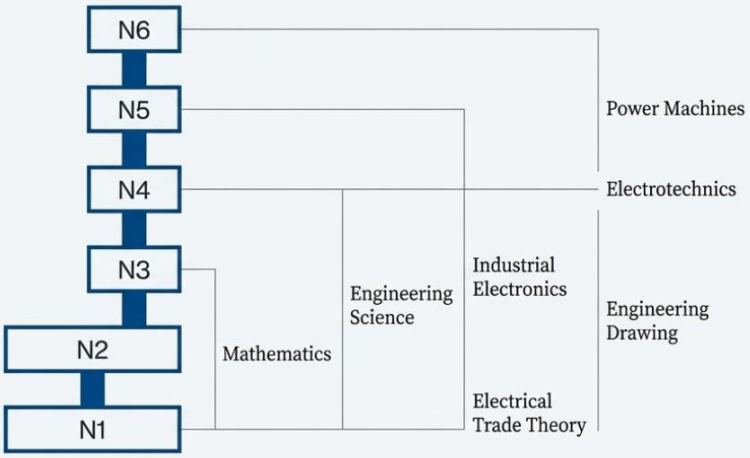
Digital Proficiency

Further indicating a grasp of modern digital ecosystems through readiness for "Google Play Store Optimization" certification.

NotebookLM

A Structured Ascent Through National Engineering Qualifications

Progression through the South African N-Level qualifications (NATED) provides a structured, multi-level pathway to an engineering diploma, governed by national bodies including DHET, SAQA, and QCTO.



SAQA Verification

Awarded Diploma formally recognized under SAQA Qualification ID: 71638.

NotebookLM

From Blueprint to Reality: Applied Skills in the Engineering Laboratory

Bridging theory and practice through hands-on training with industry-standard didactic systems, translating abstract formulas into tangible, measurable results.

Key Skills (#6C757D)

- **Motor Analysis:** Set-up for DC shunt-wound motor "Load characteristic": Measure armature voltage and current; connect motor to starter; subject motor to a load.
- **Component Craftsmanship:** Detailed motor rewinding: remove winding, prepare new winding on a spool, solder and insulate, reassembly and test.
- **Power Electronics:** Experiments with Boost Converters and PWM inverters using DSPACE and Power-Pole test benches.
- **Transformer Testing:** Determination of efficiency and voltage regulation of single-phase transformers by direct loading.

NotebookLM

Engineering with Integrity: Adherence to National Safety and Installation Standards

Safe and reliable electrical installations are non-negotiable, governed by a framework of compulsory national standards ensuring practitioner and public safety.

Key Standards Cited

SANS 10142 (SABS 0142)
The core standard for ensuring the basic safety of electrical installations.

VC 8036
Compulsory specification for circuit breakers.

VC 8035
Compulsory specification for earth leakage protection units.

SANS 60439-1 / IEC 60439-1
Standard for low-voltage switchgear and control gear assemblies.

Applied Safety Principles

- Protective conductor requirements for all new installations.
- Strict rules for Distribution Board mounting, accessibility, and labeling.
- Current density limits for copper busbars, such as 2A/mm² for currents up to 1600A.
- The critical function and application of Residual Current Devices (RCDs).

NotebookLM

The Business of Engineering: Commercial Acumen and Client Engagement

Successfully translating engineering expertise into commercial services, including formal project billing and participation in the industrial supply chain.

Supply Chain Participation

- Quote Request Submitted to MPC for 10 serialized parts for the Energy industry.

Financial Management

Actively managed via Xero accounting software.

INVOICE

Invoice Number: INV-0004
Date: 27 Jul 2023

Billed To: Shoprite (mmsale@shoprite.co.za)

Services Rendered
- ✓ Business Engineering
- ✓ Marketing Engineering

Total Amount:
ZAR 100,920.00

NotebookLM

Navigating the Professional and Regulatory Ecosystem

Effective engineering practice requires critical engagement within a complex ecosystem of government bodies, professional associations, and regulatory frameworks.

Analysis of Stakeholders Consulted for Final Verification

56

Total Participants

Representative stakeholder categories:

- Workplace Practitioners
- Professional/Regulatory Bodies
- Employer/Employee Associations
- Public & Private Education Providers
- Curriculum Development Specialists

National Treasury Engagement

Submission of SBD 8 & SBD 9 bidding documents via the Central Supplier Database (CSD).

national treasury
Department:
National Treasury
REPUBLIC OF SOUTH AFRICA

Professional Association Interaction

Active interaction and mediation with the Electrical Conformance Board (ECB) of South Africa.

ECB

NotebookLM

Identifying a Systemic Challenge: Bridging the Gap Between Education and Industry

A critical disconnect exists between theoretical engineering curricula and the practical, on-site realities of the South African energy sector. Students face significant barriers to gaining meaningful work experience in high-stakes environments with employers like City Power and Eskom.

"Students were not on site... a dangerous place for health... working in higher voltage and irregularity."
#6C757D
"The system needs a trainer for appropriate job training and a faculty for the appropriate school."
#6C757D
"The core challenge is to integrate 'school assessment portfolio' with 'workplace workshop mentoring'."
#6C757D
Academic Curriculum
• NATED Syllabus
• Theoretical Principles
• Lab Experiments
Skills Mismatch & Unsafe Access to Training
Industry Needs
• On-Site Competency
• High-Voltage Environments
• Employer Demands (City Power, Eskom)

NotebookLM

A Blueprint for Innovation: A Proposed Framework for Engineering Education and Industry Integration

A formal research project submitted to the Eskom Expo for Young Scientists, presenting a concrete framework to address the identified skills gap.

Implementation Framework Policy for College and School Engineering Circular Assessment in Entrepreneurship and Industry Society Commissioning and Government Municipality Team Training Work

• Aim

To review and reform the system of learner induction and career transition, creating a standardized, synchronized framework between educational institutions (St Peace College) and industry partners (City Power, Eskom).

• Research Questions

How can the transition phase for learners be optimized to resolve the mismatch between junior graduate capabilities and the demands of industry, considering human resources, material capacity, and project tenders?

• Engineering Goals

To design and facilitate an updated learner entry model (N1-N6) that aligns with current industry job requirements and creates a clear, efficient pipeline from education to employment.

• Methodology

Utilize a toolkit of log books, databases, panel systems, and assessment rubrics. Implement a process of stakeholder synchronization, data collection, and both formative and summative assessments to monitor the framework's efficacy.

NotebookLM

Neue Haas Grotesk Display Pro Bold

A Vision for a Technologically Advanced and Sustainable Energy Future

Source Serif Pro Regular

Solving the skills gap is the foundational step towards addressing South Africa's broader energy challenges and embracing the Fourth Industrial Revolution (4IR).

Neue Haas Grotesk Display Pro Medium

Energy Generation & Sustainability

Key point

City Power's strategic exploration of engaging Independent Power Producers (IPPs).

Proposed 27.5 MW solar PV system	7.2 MWh Lithium-Ion storage
9.32% ROI	**7-Year** Payback Period

Research Focus Source Serif Pro Italic

Nanotechnology for improved solar panels and safer mining.

Neue Haas Grotesk Display Pro Medium

Fourth Industrial Revolution (4IR) Skills

Key point

Full-time development program for unemployed youth.

Targeted Technologies	Certifications
Robotics	Cisco IT
Coding (C++, Python)	CCNA Security
IoT	Linux
3D Design	

Neue Haas Grotesk Display Pro Medium

Smart Infrastructure

Key point

Eskom's smart prepaid meter program to empower consumers and improve grid reliability.

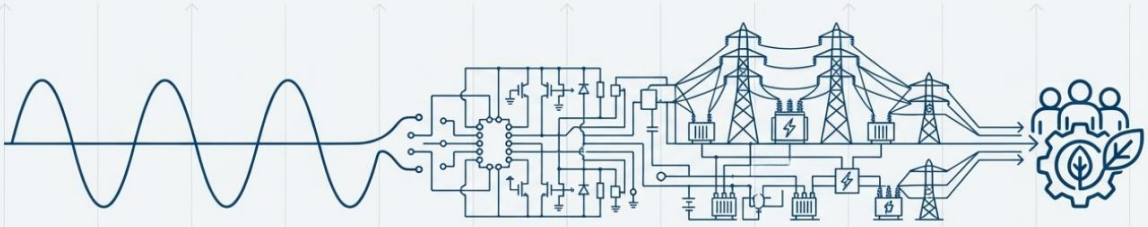
Development Focus Source Serif Pro Italic

Advanced metering approaches and complex energy systems monitoring.

NotebookLM

The Complete Engineer: From Component to System, from Science to Society

The journey begins with the fundamental laws of physics, is forged through hands-on practice and professional engagement, and culminates in the ability to analyze, critique, and innovate at a systemic level—connecting technical proficiency with a clear and vital purpose.



› **“Science is the study of the nature and behaviour of natural thing... engineering common for Latin word ingenieure v. means to design... successful engineering must improve the quality of life.”**

NotebookLM

From Theory to Impact: The Professional Profile of Fiston Tshingombe Tshitadi

An Engineering Innovator Bridging Academics, Application, and Entrepreneurship

Academics Application Entrepreneurship

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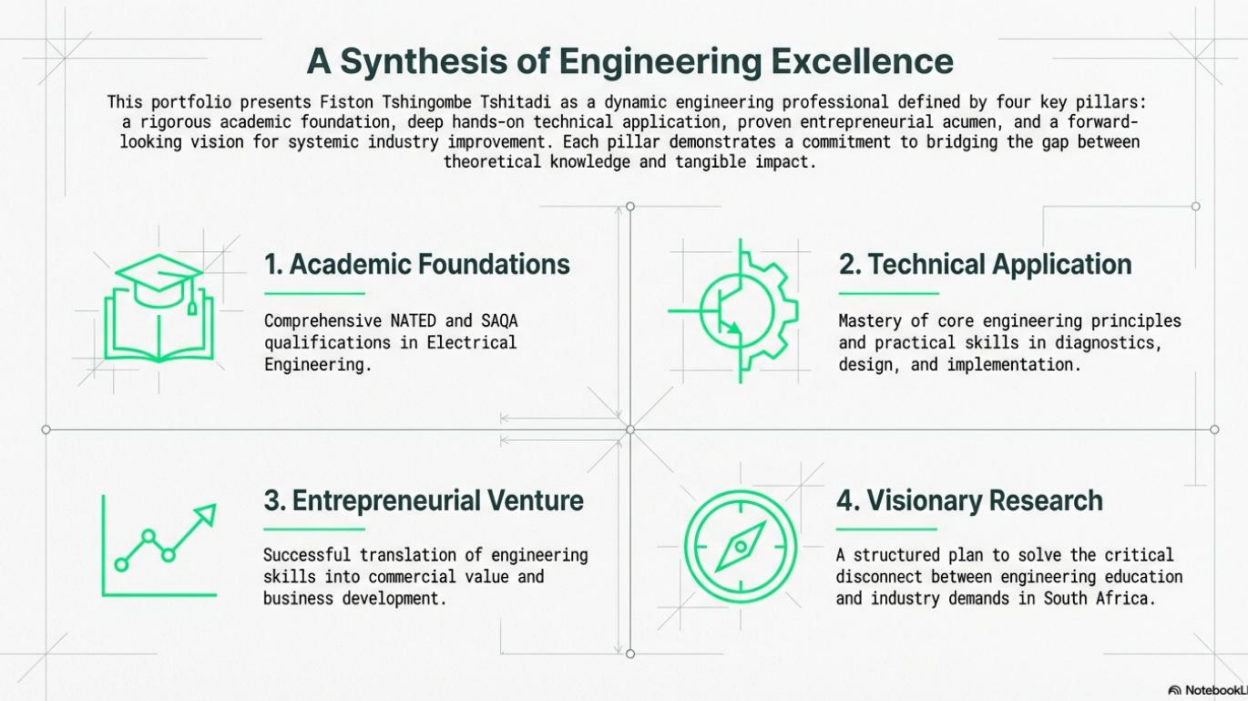
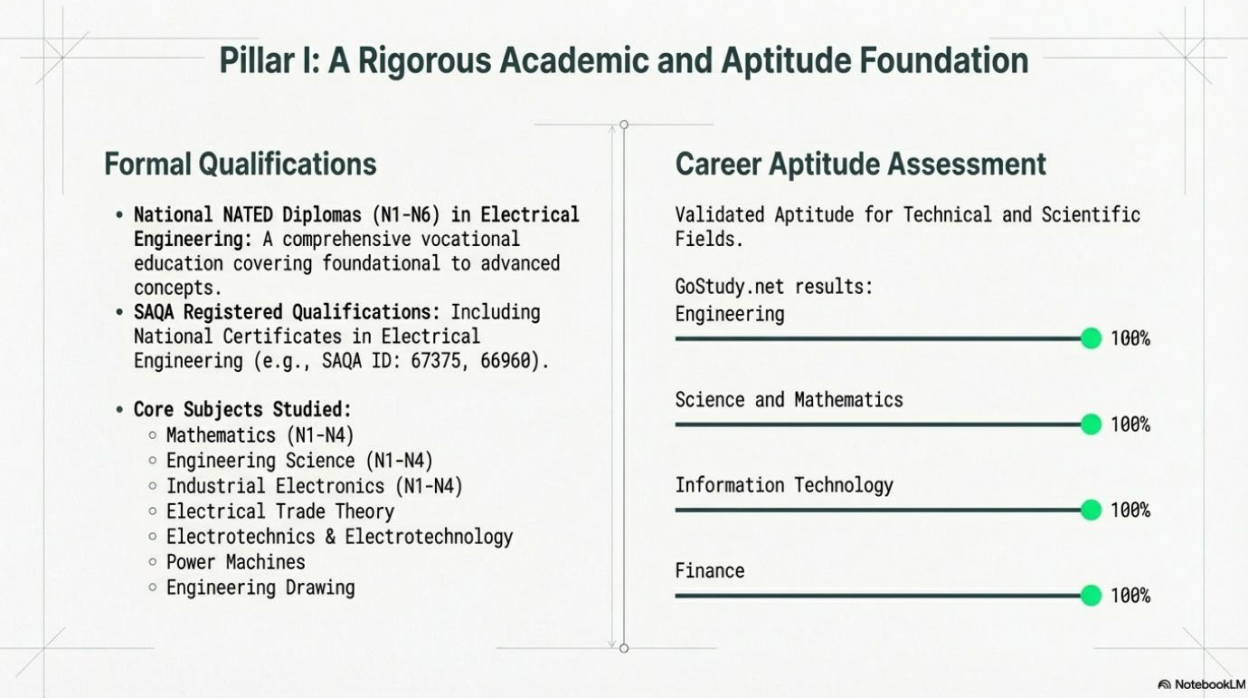

A Synthesis of Engineering Excellence
This portfolio presents Fiston Tshingombe Tshitadi as a dynamic engineering professional defined by four key pillars: a rigorous academic foundation, deep hands-on technical application, proven entrepreneurial acumen, and a forward-looking vision for systemic industry improvement. Each pillar demonstrates a commitment to bridging the gap between theoretical knowledge and tangible impact.
1. Academic Foundations
Comprehensive NATED and SAQA qualifications in Electrical Engineering.
2. Technical Application
Mastery of core engineering principles and practical skills in diagnostics, design, and implementation.
3. Entrepreneurial Venture
Successful translation of engineering skills into commercial value and business development.
4. Visionary Research
A structured plan to solve the critical disconnect between engineering education and industry demands in South Africa.
NotebookL


Pillar I: A Rigorous Academic and Aptitude Foundation
Formal Qualifications
National NATED Diplomas (N1-N6) in Electrical Engineering: A comprehensive vocational education covering foundational to advanced concepts.
SAQA Registered Qualifications: Including National Certificates in Electrical Engineering (e.g., SAQA ID: 67375, 66960).
Core Subjects Studied:
Mathematics (N1-N4)
Engineering Science (N1-N4)
Industrial Electronics (N1-N4)
Electrical Trade Theory
Electrotechnics & Electrotechnology
Power Machines
Engineering Drawing
Career Aptitude Assessment
Validated Aptitude for Technical and Scientific Fields.
GoStudy.net results:
Engineering 100%
Science and Mathematics 100%
Information Technology 100%
Finance 100%
NotebookLM

Pillar II: Mastery of Core Engineering Principles

A profound understanding of the mathematical and physical laws governing electrical systems is the bedrock of effective engineering. This selection of applied formulae demonstrates mastery across key domains.

Circuit Theory

Kirchhoff's Laws:

$$E_T = I_1 \cdot R_1 + (I_1 - I_2) R_3$$

Thévenin/Norton Equivalents

AC/DC Machines

Synchronous Motor Equations:

$$V = E_b + I_a(R_a + Jxs)$$

DC Motor Equations:

$$N = \frac{v - I_a R_a}{k \cdot \phi}$$

Transformers

Voltage Regulation:

$$\%\,\text{reg} = \frac{v_{(\text{no-load})} - v_{(\text{full load})}}{v_{(\text{no-load})}} \times 100\%$$

Turns Ratio:

$$\frac{N_1}{N_2} = \frac{V_1}{V_2}$$

Three-Phase Connections (Star-Delta)

Electromagnetism

Biot-Savart Law:

$$d\vec{B} = \frac{\mu_0 \cdot I\, d\vec{s} \times \hat{r}}{4\pi r^2}$$

Faraday's Law:

$$E = -\frac{\Delta \Phi}{\Delta t}$$

Calculus & Advanced Mathematics

Differential Equations:

$$\frac{dy}{dx} + P(x)y = Q(x)$$

Integration for Volume:

$$V = \int \pi [y(x)]^2 \, dx$$

Limits:

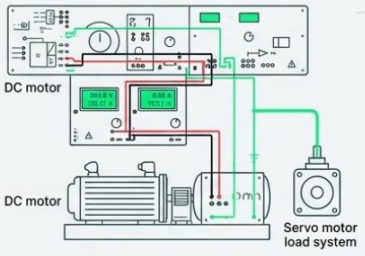
$$\lim_{n \to \infty} \left(1 + \frac{1}{n}\right)^n = e$$

NotebookLM

From the Lab to the Field: Applied Technical Expertise

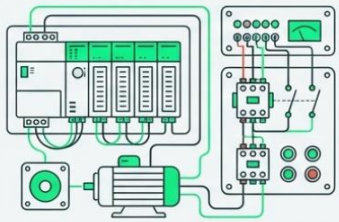
Practical Skills & Diagnostics

- **Motor Rewinding:** Detailed process knowledge, including stator analysis (e.g., `number of stator gaps z=24`, `width of slot b1=6,621mm`).
- **Fault Finding & Protection:** Expertise in control circuits, protective devices, fault discrimination, and compliance with installation rules (PVC, flexible conduit).
- **Installation & Compliance:** Deep familiarity with SABS/SANS standards (e.g., SANS 10142) for electrical installations, including distribution boards, circuit breakers, and earth leakage protection.



Laboratory & Didactic Experience

- **Hands-on Training:** Experience with advanced didactic training systems for electrotechnology, PLC, and motor control.
- **Key Experiments:**
  - Determination of Efficiency and Voltage Regulation of a single-phase Transformer by direct loading.
  - DC Shunt-Wound Motor 'Load characteristic' setup.
  - Power electronics labs using modular Lab-Volt and DSPACE equipment.



NotebookLM

Specialized Knowledge in Power System Design and Analysis

Substation Design & Calculation

- System Planning & Short Circuit Studies
- Load Flow & Insulation Coordination Studies
- Ground Grid & Lightning Protection Calculation

Protection & Control Systems

- Electrical Protection and Control Analysis
- AC/DC Auxiliary Power Systems & Battery Calculation
- SCADA & Load Management Projects

Generation & Transmission

- Synchronous Generator and Transmission Systems
- Analysis of Symmetrical/Asymmetrical Faults
- Reactive Power Compensation Strategies

Robotics & Automation

- Robot Dynamics, Kinematics, and Control
- Forward Kinematics for Planar Robots
- PLC Programmable Logic and Control

NotebookL

Pillar III: The Entrepreneurial Drive: Building a Venture

TSHINGOMBE

Translating technical expertise into market value is a hallmark of an engineering innovator. The 'Tshingombe' enterprise was established to provide specialized engineering services.

Formal Business Operations

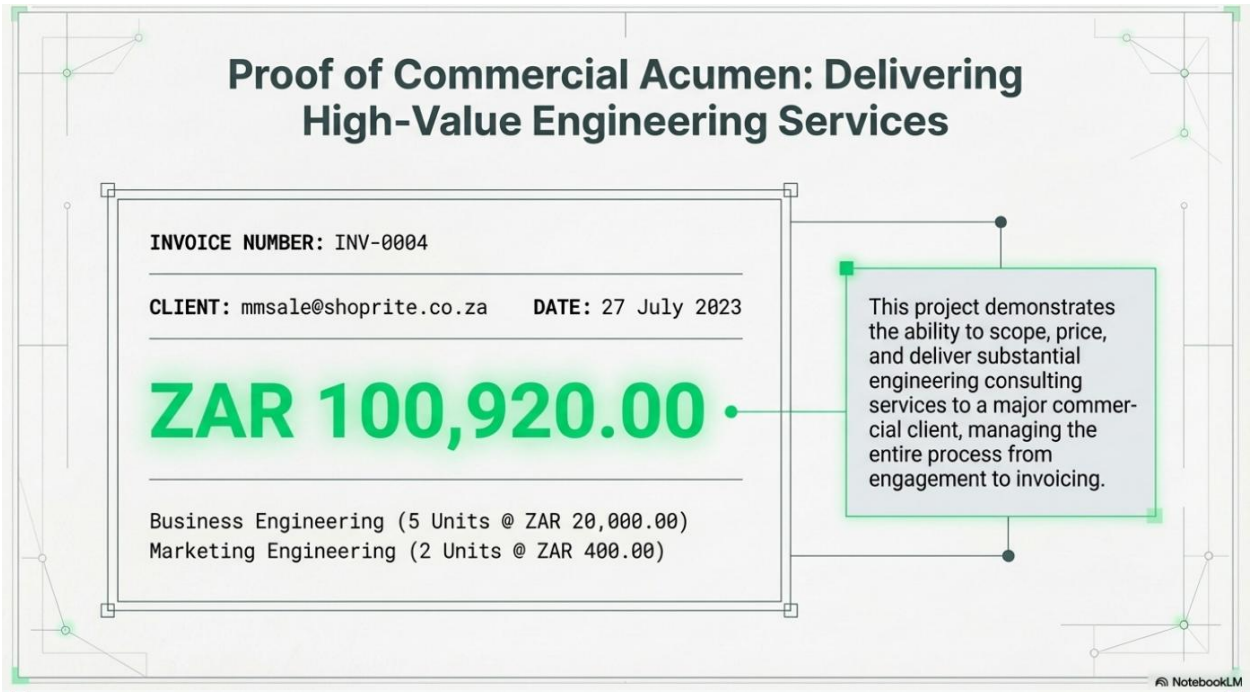
- **Entity**: Tshingombe
- **Services**: Business Engineering, Marketing Engineering, Technical Consulting.
- **Systems**: Utilizes professional business management software including Xero and QuickBooks for invoicing, accounting, and financial reporting.

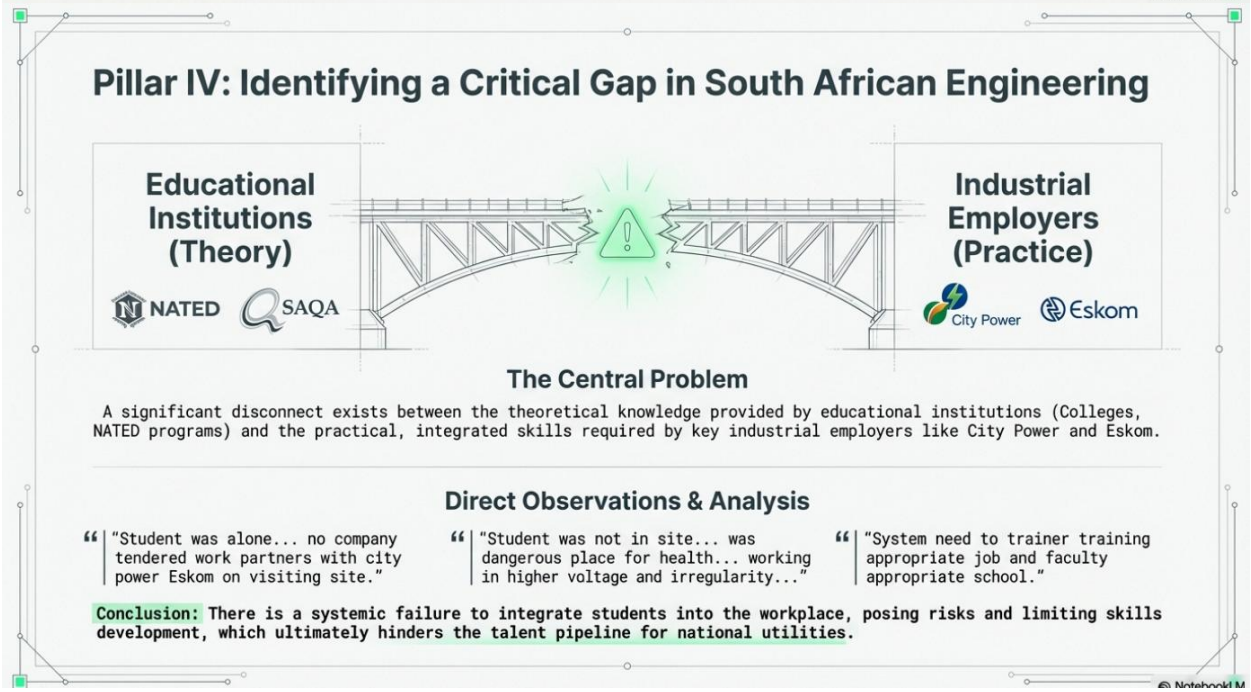
Engagement with Public & Private Sector Procurement

- **Government Supplier Registration**: Registered on the National Treasury's Central Supplier Database (CSD), enabling formal engagement with government tenders.
- **Formal Bidding**: Actively participates in procurement processes, demonstrated by the completion and submission of Standard Bidding Documents (SBD 8 & SBD 9).
- **Proactive Business Development**: Engages with potential clients for specialized components, evidenced by a quote request to Metalphoto of Cincinnati for serialized parts for the Energy industry.

national treasury
Department: National Treasury
REPUBLIC OF SOUTH AFRICA

NotebookLM


Proof of Commercial Acumen: Delivering High-Value Engineering Services
INVOICE NUMBER: INV-0004
CLIENT: mmsale@shoprite.co.za
DATE: 27 July 2023
ZAR 100,920.00
Business Engineering (5 Units @ ZAR 20,000.00)
Marketing Engineering (2 Units @ ZAR 400.00)
This project demonstrates the ability to scope, price, and deliver substantial engineering consulting services to a major commercial client, managing the entire process from engagement to invoicing.
NotebookLM


Pillar IV: Identifying a Critical Gap in South African Engineering
Educational Institutions (Theory)
NATED
SAQA
Industrial Employers (Practice)
City Power
Eskom
The Central Problem
A significant disconnect exists between the theoretical knowledge provided by educational institutions (Colleges, NATED programs) and the practical, integrated skills required by key industrial employers like City Power and Eskom.
Direct Observations & Analysis
"Student was alone... no company tendered work partners with city power Eskom on visiting site."
"Student was not in site... was dangerous place for health... working in higher voltage and irregularity..."
"System need to trainer training appropriate job and faculty appropriate school."
Conclusion: There is a systemic failure to integrate students into the workplace, posing risks and limiting skills development, which ultimately hinders the talent pipeline for national utilities.

A Vision for Systemic Change: A National Research Proposal

Section 1: The Proposal

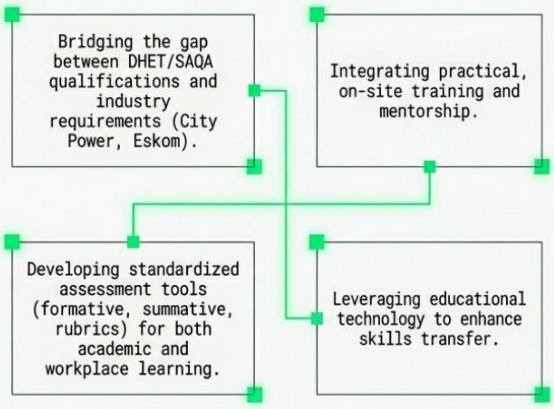
Project Submission

A formal research plan developed for the **Eskom Expo for Young Scientists**.

Distilled Project Goal

To create and implement a national framework that aligns engineering curricula, assessment policies, and technological education with the real-world operational needs of industry, ensuring a seamless transition for graduates into the workplace.

Section 2: Key Focus Areas


Bridging the gap between DHET/SAQA qualifications and industry requirements (City Power, Eskom).
Integrating practical, on-site training and mentorship.
Developing standardized assessment tools (formative, summative, rubrics) for both academic and workplace learning.
Leveraging educational technology to enhance skills transfer.

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The Research Framework: A Blueprint for Integration

A structured approach to analyze the current system, design a new integrated model, and implement it through stakeholder collaboration.

Key Project Activities & Objectives

Objective	Activity	Budgeted Cost
Objective 1: Curriculum & Policy Assessment	Engineering electrical assessment curriculum policy.	ZAR 50,000
	Electrical portfolio review.	ZAR 50,000
	Total Objective 1: ZAR 100,000	
Objective 2: Learner & Study Assessment	Engineering studies assessment.	ZAR 50,000
		ZAR 50,000
	Total Objective 2: ZAR 100,000	

Core Method

- The project will utilize a systematic process including learner pipeline management, material development, workplace site analysis, and robust monitoring & evaluation mechanisms to ensure project objectives are met.

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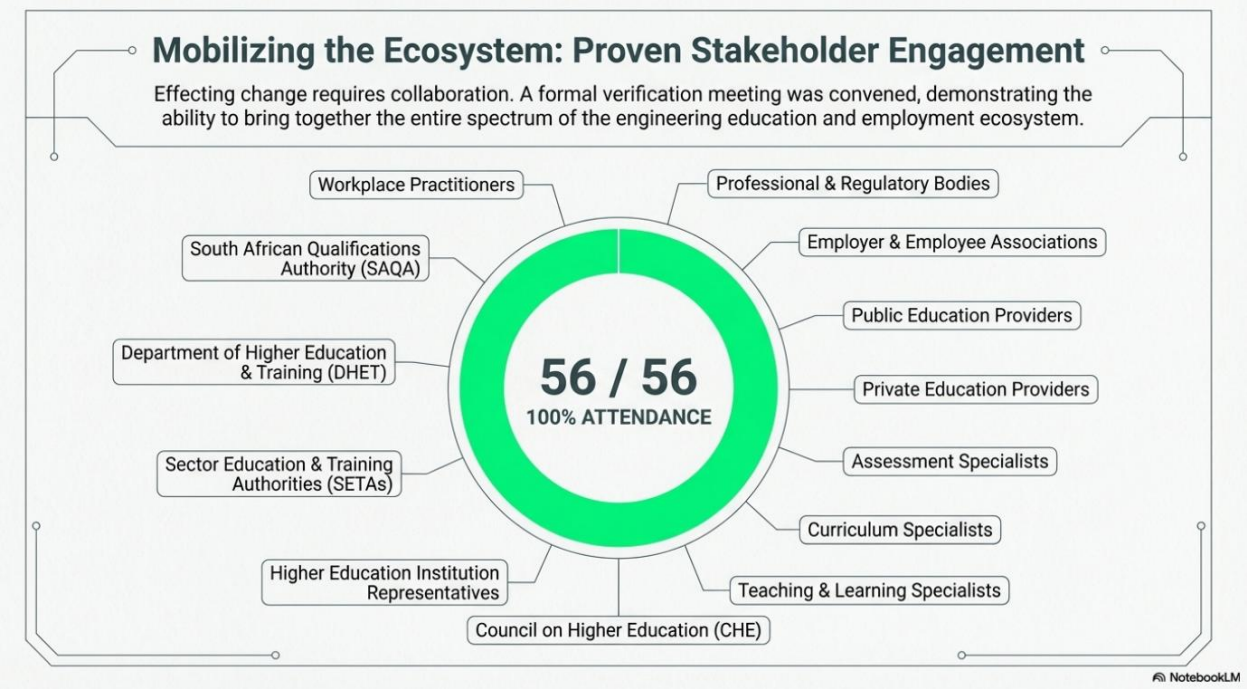
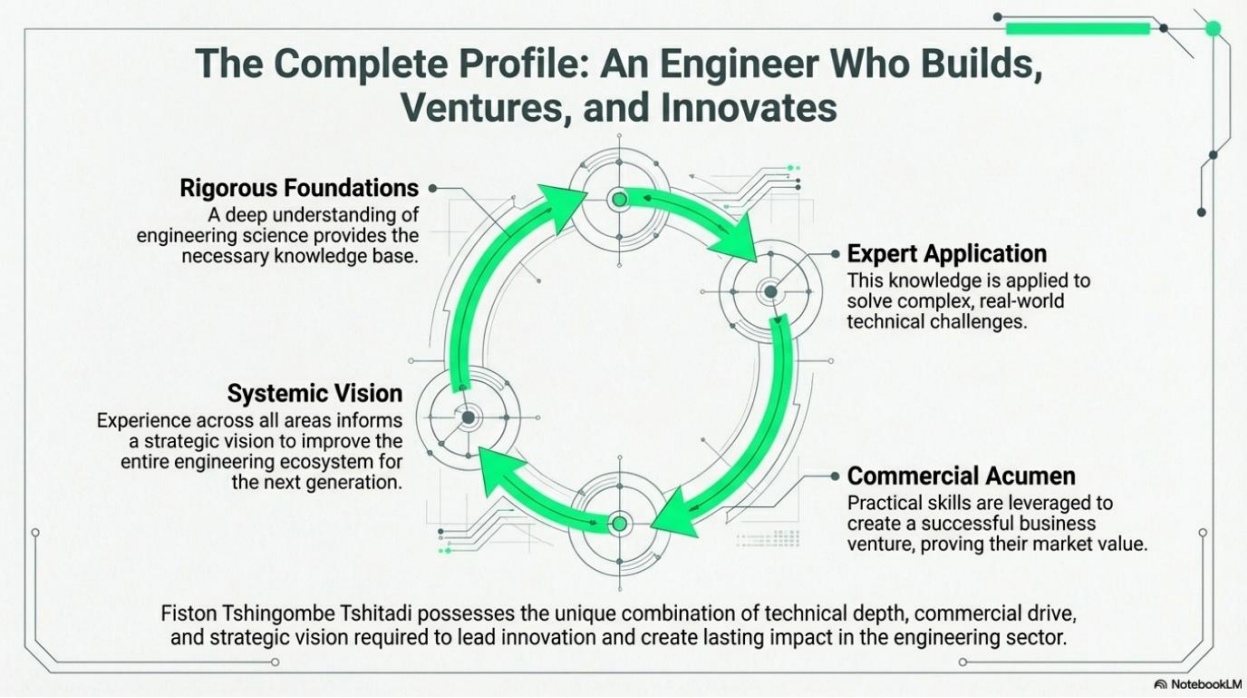

Mobilizing the Ecosystem: Proven Stakeholder Engagement
Effecting change requires collaboration. A formal verification meeting was convened, demonstrating the ability to bring together the entire spectrum of the engineering education and employment ecosystem.
Workplace Practitioners
Professional & Regulatory Bodies
South African Qualifications Authority (SAQA)
Employer & Employee Associations
Public Education Providers
Department of Higher Education & Training (DHET)
56 / 56
100% ATTENDANCE
Private Education Providers
Assessment Specialists
Sector Education & Training Authorities (SETAs)
Curriculum Specialists
Higher Education Institution Representatives
Teaching & Learning Specialists
Council on Higher Education (CHE)
NotebookLM


The Complete Profile: An Engineer Who Builds, Ventures, and Innovates
Rigorous Foundations
A deep understanding of engineering science provides the necessary knowledge base.
Expert Application
This knowledge is applied to solve complex, real-world technical challenges.
Systemic Vision
Experience across all areas informs a strategic vision to improve the entire engineering ecosystem for the next generation.
Commercial Acumen
Practical skills are leveraged to create a successful business venture, proving their market value.
Fiston Tshingombe Tshitadi possesses the unique combination of technical depth, commercial drive, and strategic vision required to lead innovation and create lasting impact in the engineering sector.
NotebookLM

Contact & Professional Details

Fiston Tshingombe Tshitadi

Email: tshingombekb@gmail.com

Location: Johannesburg, Gauteng, South Africa

Key Competencies

- Electrical Engineering (NATED / SAQA)
- Power Systems Analysis & Design
- Entrepreneurship & Business Management
- Educational Framework & Curriculum Development

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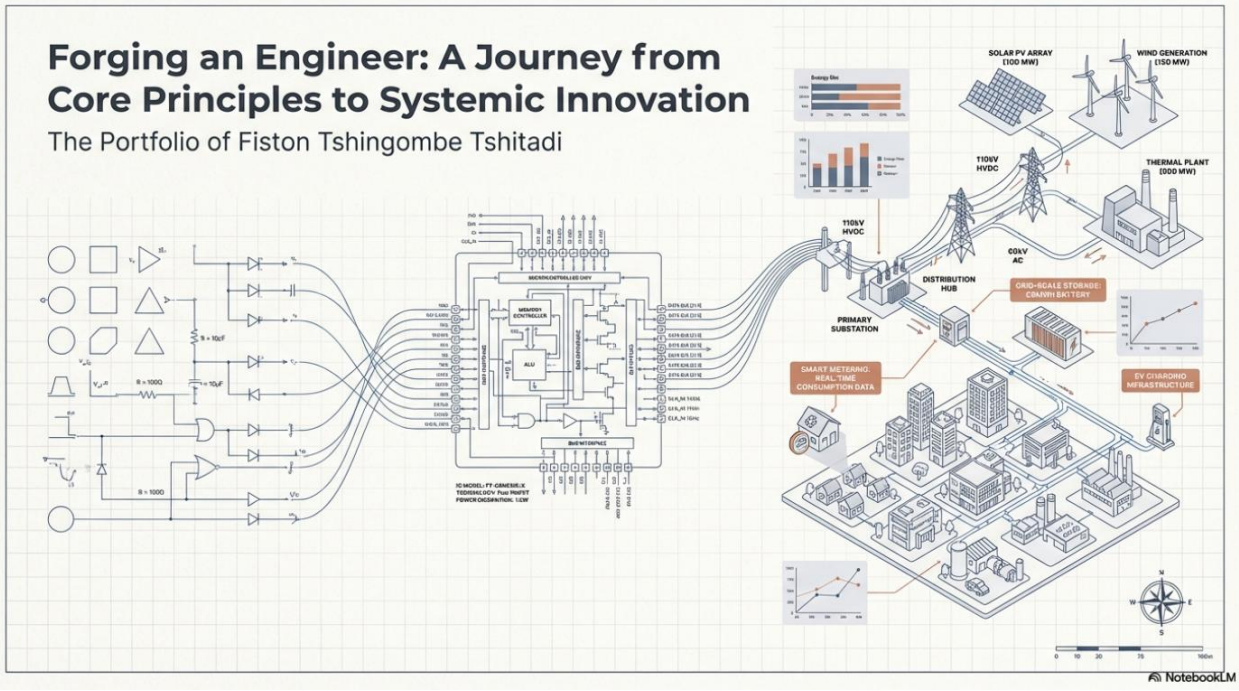
Forging an Engineer: A Journey from Core Principles to Systemic Innovation
The Portfolio of Fiston Tshingombe Tshitadi
SOLAR PV ARRAY (100 MW)
WIND GENERATION (150 MW)
THERMAL PLANT (800 MW)
110kV HVDC
DISTRIBUTION HUB
PRIMARY SUBSTATION
SMART METERING: REAL-TIME CONSUMPTION DATA

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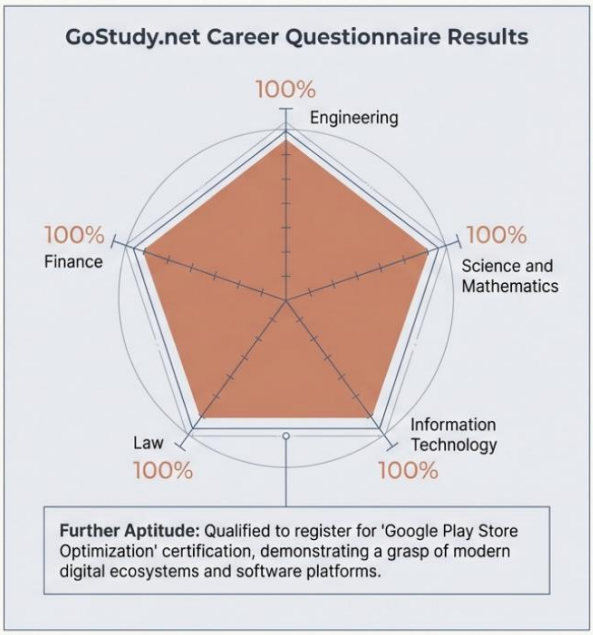
An Innate Aptitude for Engineering andTechnology

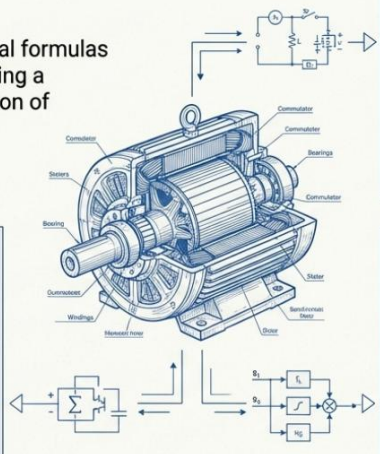
A successful engineering career begins with a natural inclination towards analytical, systemic, and technical fields. An initial career assessment provides an objective data point, revealing a strong, pre-existing alignment with core engineering and technology disciplines.



NotebookLM

Mastering the Language of Engineering: Core Scientific Principles

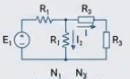
This slide distills a vast array of technical formulas into key conceptual domains, representing a structured and comprehensive foundation of theoretical knowledge.



Circuit Analysis & Electromagnetism

Kirchhoff's & Norton's theorems:

$ET=I1.R1+(I1-I2)R3$



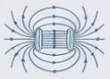
Transformer Equations:

$N1 \div N2 = V1 \div V2$

$$\% \text{ Regulation} = \frac{V_{(no\text{-}load)} - V_{(full\text{-}load)}}{V_{(no\text{-}load)}} * 100\%$$

Biot-Savart Law:

$$dB = (\mu_0 * I * \frac{\mu_0 * I * ds * r}{4 * \pi * r^2}$$



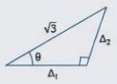
Power Systems & Machines

Synchronous Motor Equations:

$V=Eb+Ia(Ra+Jxs)$

Synchronous Speed:

$N_S = 120f/p$



Power Factor Calculation:

$\tan\Phi=\sqrt{3}(P2-P1) \div (P2+P1)$

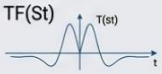
Efficiency:

$$\text{Eff} = \frac{\text{useful energy or work out}}{\text{total energy input}}$$

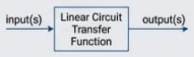
Control Systems & Signal Processing

Fourier Transforms:

$TF(St)$



Filtre lineare box:

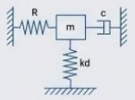


Laplace Transforms & System Stability:

$L.di/dt+Ri=E°\cos(\omega t)$

Robotics & Kinematics:

$mx''+cx'+kx=f(t)$



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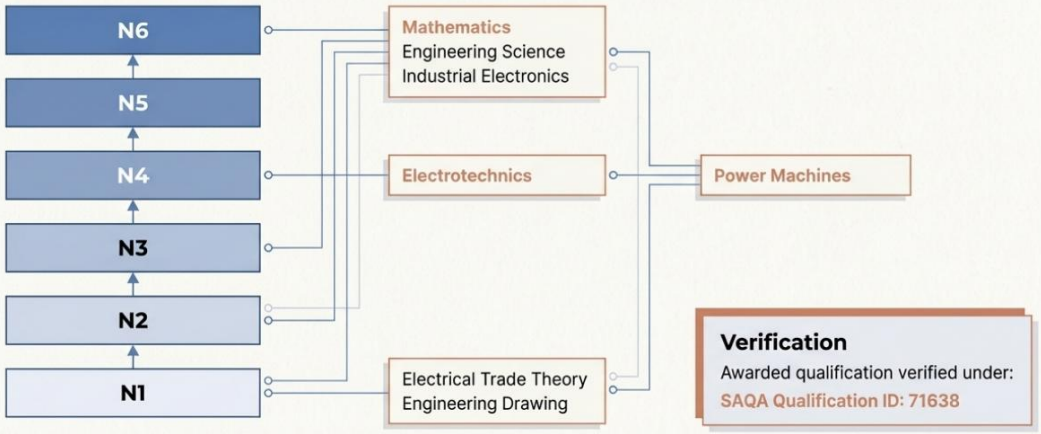
A Structured Ascent Through National Engineering Qualifications

The progression through South Africa's N-Level qualifications (NATED) provides a standardized, multi-level pathway to an engineering diploma, governed by bodies like DHET, SAQA, and QCTO.

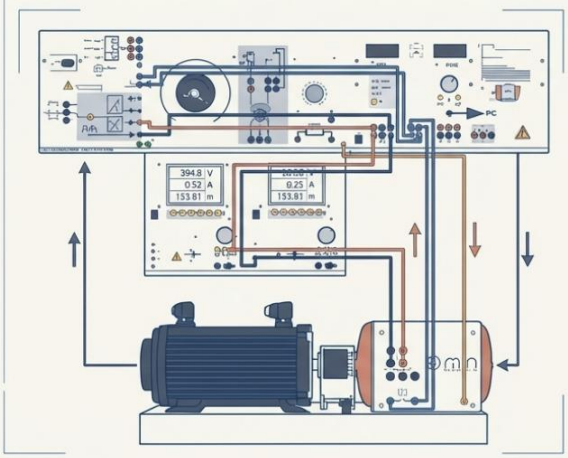
NATED Curriculum Progression (N1-N6)



NotebookLM

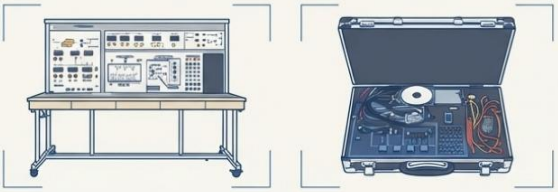
From Blueprint to Reality: Applied Skills in the Engineering Laboratory

Hands-on training using industry-standard didactic systems bridges the gap between theoretical principles and practical, real-world application.



Key Experiments & Skills

- **Motor Analysis:** Setup for DC shunt-wound motor 'Load characteristic' test, including measuring armature voltage/current and subjecting the motor to a load.
- **Component Craftsmanship:** Detailed motor rewinding process, from winding removal to soldering, insulation, and final testing.
- **Power Electronics:** Experiments with Boost Converters and PWM inverters using DSPACE and Power-Pole test benches.
- **Transformer Testing:** Determination of efficiency and voltage regulation of single-phase transformers via direct loading.



NotebookLM

Engineering with Integrity: Adherence to National Safety and Installation Standards

Safe, reliable electrical installations are non-negotiable. All practical work is governed by a strict framework of compulsory national standards and safety regulations.

Key Standards Cited

SANS 10142 (SABS 0142)
The core standard ensuring the basic safety of electrical installations.

VC 8036
Compulsory specification for circuit breakers.

VC 8035
Compulsory specification for earth leakage protection units.

SANS 60439-1 / IEC 60439-1
Standard for low-voltage switchgear and control gear assemblies.

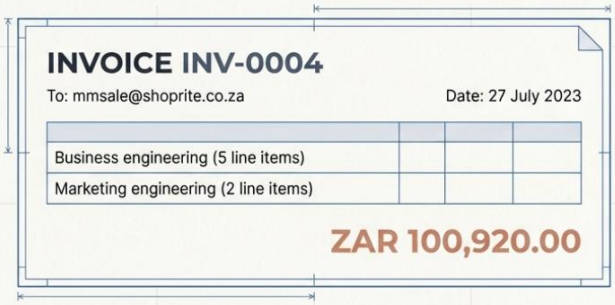
Applied Safety Principles

- Protective conductor requirements for new installations.
- Rules for Distribution Board mounting, access, and labeling.
- Current density limits for copper busbars (e.g., 2A/mm² for currents up to 1600A).
- Function and application of RCDs (Residual Current Devices).

NotebookLM

The Business of Engineering: Commercial Acumen and Client Engagement

Demonstrating the ability to translate engineering expertise into commercial services, including project billing, client management, and supply chain participation.



MPC Web Quote Request

Request for quotation submitted for 10 serialized parts for the Energy industry, demonstrating engagement with industrial suppliers.

Xero Accounting

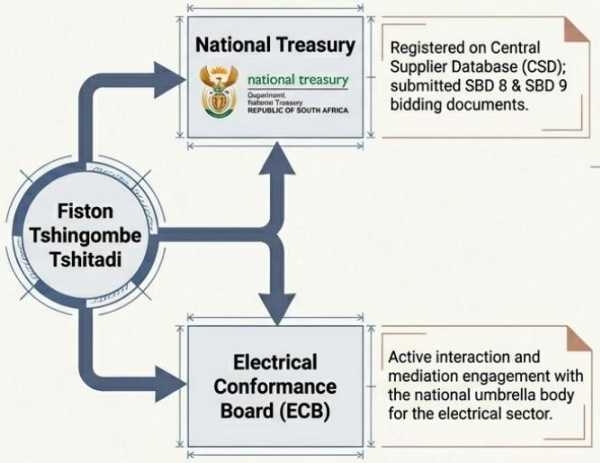
NotebookLM

Navigating the Professional and Regulatory Ecosystem

Effective engineering practice requires critical engagement within a complex ecosystem of government bodies, professional associations, and regulatory frameworks.

Analysis of Stakeholders Consulted for Final Verification

Classification	Participants
Workplace Practitioners	4
Professional/Regulatory Bodies	4
Employer/Employee Associations	4
Education and Training Providers (Public & Private)	4
Curriculum Development Specialists	4
Total Participants Consulted	**56**


Fiston Tshingombe Tshitadi
National Treasury
national treasury
Registered on Central Supplier Database (CSD); submitted SBD 8 & SBD 9 bidding documents.
Electrical Conformance Board (ECB)
Active interaction and mediation engagement with the national umbrella body for the electrical sector.

NotebookLM

Identifying a Systemic Challenge: Bridging the Gap Between Education and Industry

A critical disconnect exists between the formal engineering curriculum and the practical, on-site realities faced by major employers. Students struggle to gain meaningful work experience in high-stakes environments, creating a systemic skills gap.

"The day visit was not defined... student was not on site... it was a dangerous place for a health student working in higher voltage with irregularity in the system."

"The system needs a trainer for appropriate job training and a faculty for an appropriate school."

"The core challenge is to integrate the system to a standard of knowledge support by combining the school assessment portfolio with workplace and workshop mentoring."

NotebookLM

A Blueprint for Innovation: A Proposed Framework for Engineering Education and Industry Integration

A formal research project submitted to the "Eskom Expo for Young Scientists" proposing a concrete, data-driven solution to bridge the education-industry gap.

Implementation Framework Policy for College and School Engineering Circular Assessment in Entrepreneurship and Industry Society Commissioning, and Government Municipality Team Training for Graduate Engineering Work Timeframes.

AIM

To review and reform the system of learner induction and career transition, creating a standardized, synchronized framework between educational institutions (e.g., St Peace College) and industry partners (e.g., City Power, Eskom).

RESEARCH QUESTIONS

To analyze factors affecting job career outcomes and the transition phase for learners. How can a college cadet function as a graduate to resolve demand factors in human resources, tendered bids, and material capacity integration?

ENGINEERING GOALS

To design and facilitate an updated learner entry model (N1-N6, NQF levels) that aligns with current industry job requirements and creates a clear, measurable pipeline from education to employment.

METHODOLOGY

Utilize specific tools (log books, databases, panel systems, assessment rubrics) and processes (stakeholder synchronization, data collection, formative & summative assessments) to implement, monitor, and validate the framework.

NotebookLM

A Vision for a Technologically Advanced and Sustainable Energy Future

Solving the skills gap is the foundational step toward addressing South Africa's broader energy challenges and embracing the opportunities of the Fourth Industrial Revolution (4IR).

Energy Generation & Sustainability

- City Power exploring engagement with **Independent Power Producers (IPPs)** to diversify energy sources.
- Analysis of a **27.5 MW solar PV system** with **7.2 MWh Li-Ion storage**, noting a **9.32% ROI** and 7-year payback period.
- Research into **nanotechnology** for building superior solar panels and enhancing mining safety.

Fourth Industrial Revolution (4IR) Skills

- Focus on developing critical skills in **robotics, coding (C++, Python), IoT, and 3D design**.
- Full-time development program for unemployed youth covering **Cisco IT, CCNA Security, and Linux**.

Smart Infrastructure

- Eskom's **smart prepaid meter program** to empower consumers and improve grid reliability.
- Development of **advanced metering approaches** and monitoring for complex energy systems.

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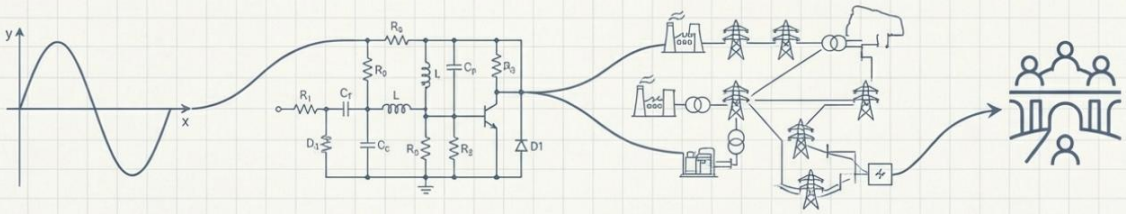
The Complete Engineer: From Component to System, from Science to Society

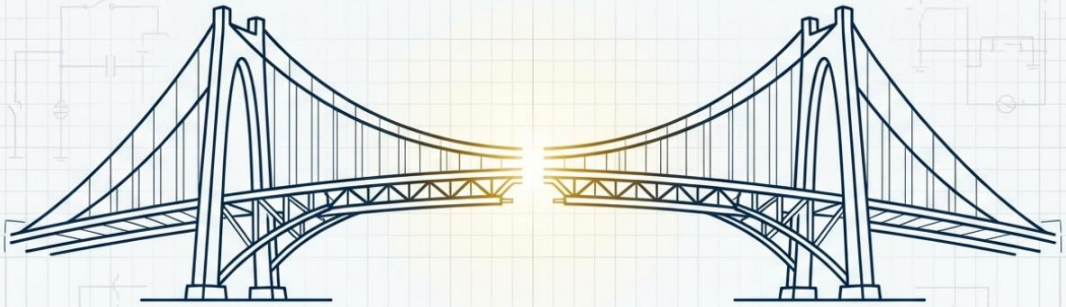
The journey begins with the fundamental laws of physics, is forged through hands-on practice and professional engagement, and culminates in the ability to analyze, critique, and innovate at a systemic level—connecting technical proficiency with a greater purpose.



"Science is the study of the nature and behaviour of natural things... engineering comes from the Latin word 'ingeniere' which means to design... successful engineering must improve the quality of life."

NotebookLM

From Theory to Trade: A New Framework for Engineering Excellence in South Africa



Bridging the critical gap between technical education and industry demands to build a competent, safe, and innovative workforce.

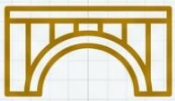
Presented by Fiston Tshingombe Tshitadi

NotebookLM

The Challenge and The Opportunity

The Problem

A dangerous disconnect exists between South Africa's NATED-based theoretical engineering education and the practical skills required by industry and SAQA/QCTO occupational qualifications.



The Solution

An integrated framework that linearizes curriculum, embeds structured work-based learning with partners like **City Power and Eskom**, and creates a clear, unified pathway to trade certification.

The Outcome

A pipeline of **skilled artisans**, **enhanced industrial safety and productivity**, **reduced skills mismatch**, and a **stronger national energy and infrastructure sector**.

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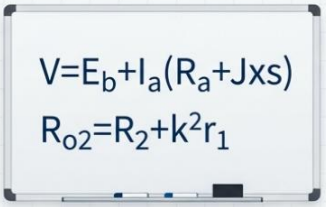
The Unique Expertise to Build the Bridge



The Engineer

Deep, hands-on expertise in Electrical Engineering, from fundamental principles to complex industrial applications.

The Educator & Systems Analyst

In-depth knowledge of South Africa's educational and qualifications labyrinth, including DHET, SAQA, QCTO, and ECSA frameworks.

The Entrepreneur

Proven experience in business engineering, project management, and delivering value to industrial clients.

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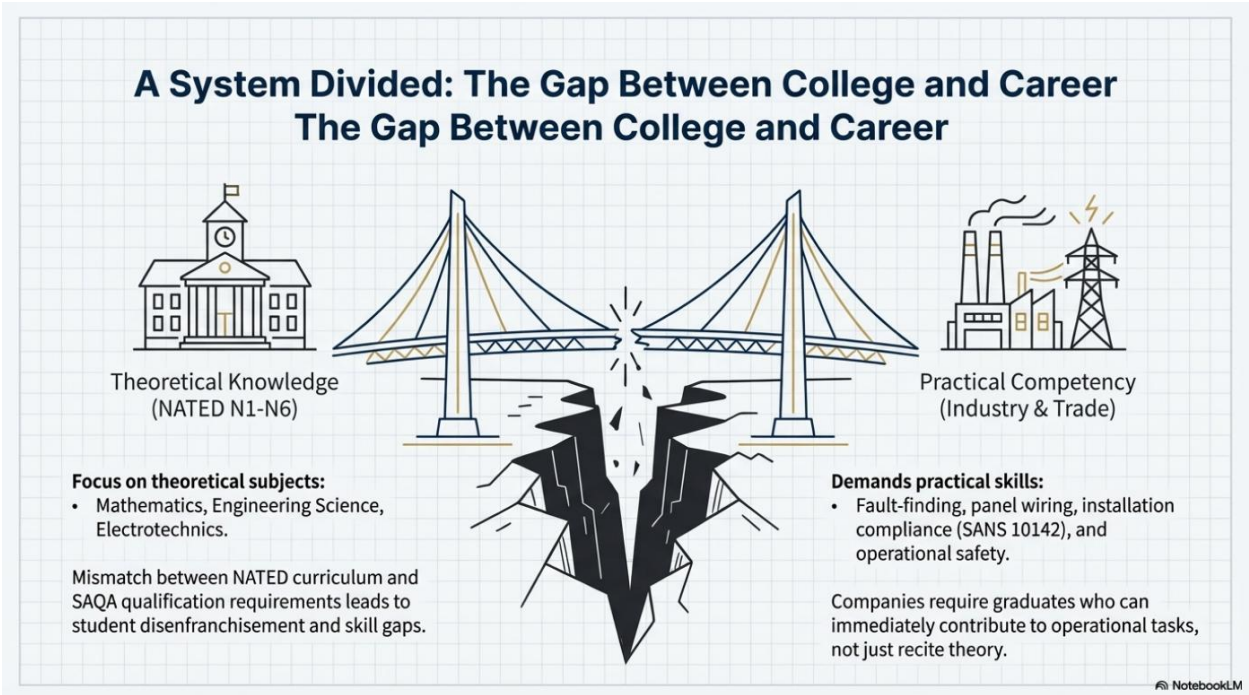
A System Divided: The Gap Between College and Career
The Gap Between College and Career
Theoretical Knowledge
(NATED N1-N6)
Practical Competency
(Industry & Trade)
Focus on theoretical subjects:
• Mathematics, Engineering Science, Electrotechnics.
Mismatch between NATED curriculum and SAQA qualification requirements leads to student disenfranchisement and skill gaps.
Demands practical skills:
• Fault-finding, panel wiring, installation compliance (SANS 10142), and operational safety.
Companies require graduates who can immediately contribute to operational tasks, not just recite theory.
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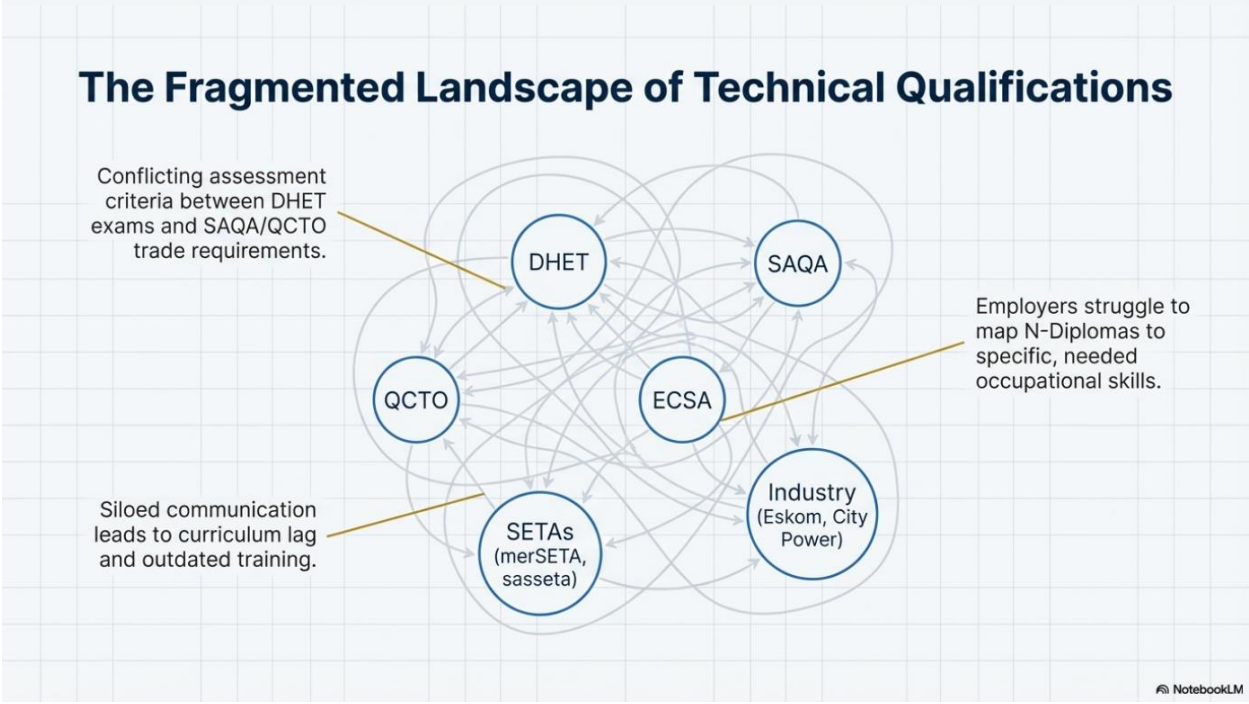
The Fragmented Landscape of Technical Qualifications
Conflicting assessment criteria between DHET exams and SAQA/QCTO trade requirements.
DHET
SAQA
QCTO
ECSA
Employers struggle to map N-Diplomas to specific, needed occupational skills.
Siloed communication leads to curriculum lag and outdated training.
SETAs
(merSETA, sasseta)
Industry
(Eskom, City Power)
NotebookLM

The Student's Ordeal: A Journey Without a Bridge

Unstructured Workplace Visits

- "Student was alone by self explanatory no company tendered work partners..."
- "...on visiting site student was not in site was dangerous place for health student working in higher voltage and irregularity students in the system."

Lack of Mentorship & Guidance

- Students are left to navigate complex systems without a clear "trainer training appropriate job and faculty."

Blocked Path to Certification

- Difficulty obtaining a "visa I'd permit student for trade exam" from Engineering and Trade Councils.
- The process to "find minimum granted for examination labor" is opaque and frustrating.

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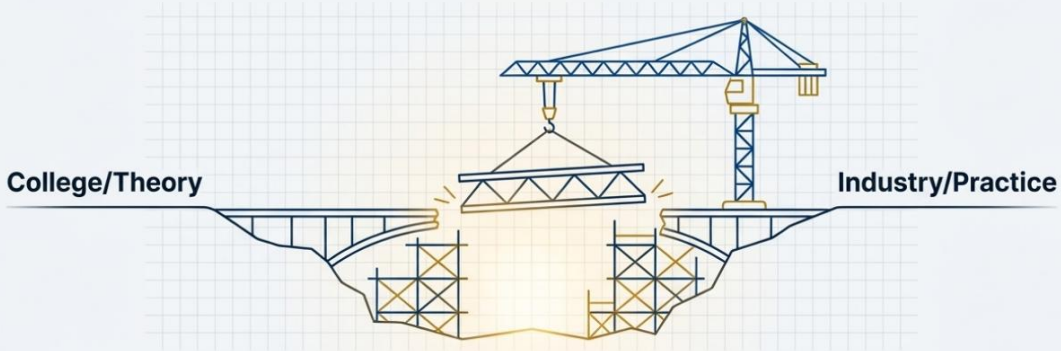
The Solution: An Integrated Framework for Competency



"Linearize"

Create a single, clear educational path that aligns NATED theory with QCTO occupational outcomes from day one.

"Integrate"

Forge formal partnerships between colleges and industry (Eskom, City Power) for structured, mentored, and safe work-based learning.

"Validate"

Develop a unified assessment model that combines college exams, practical workplace evidence (logbooks), and trade test requirements into a single portfolio of evidence (PoE).

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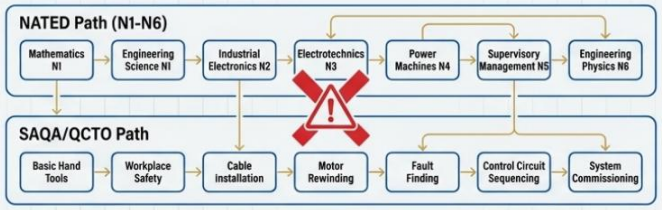
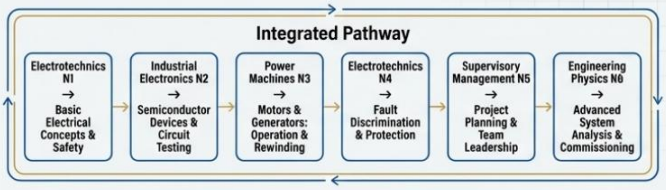
Pillar 1: Linearizing the Curriculum from N1 to Trade Test

Before State



Curriculum Mapping & Integration

After State


Integrated Pathway
Electrotechnics N1 → Basic Electrical Concepts & Safety
Industrial Electronics N2 → Semiconductor Devices & Circuit Testing
Power Machines N3 → Motors & Generators: Operation & Rewinding
Electrotechnics N4 → Fault Discrimination & Protection
Supervisory Management N5 → Project Planning & Team Leadership
Engineering Physics N6 → Advanced System Analysis & Commissioning

Key Actions

- **Curriculum Mapping**
  Directly map NATED subjects like *Industrial Electronics*, *Electrotechnics*, and *Power Machines* to specific QCTO occupational tasks such as *motor rewinding*, *fault finding*, and *control circuit sequencing*.
- **Integrating Foundational & Practical Logic**
  Combine theoretical formulas (e.g., `Lim $\frac{-b \pm \sqrt{b^2+4ac}}{2a}$, Kirchhoff's laws) with their direct application in 'operational plant mathematics' and 'fault discrimination.'
- **Standardized Didactic Materials**
  Develop unified textbooks, lab manuals, and assessment rubrics that are co-authored by lecturers and industry practitioners.

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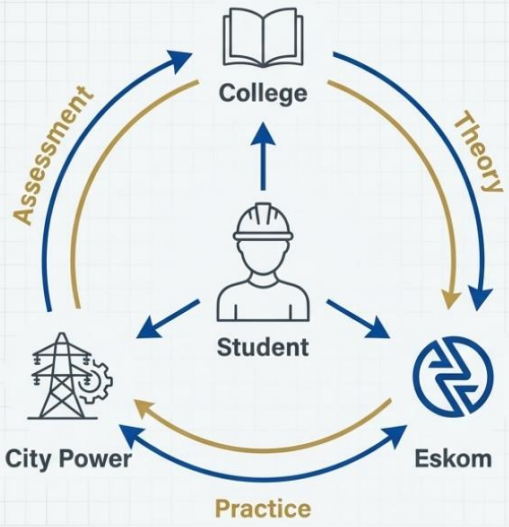
Pillar 2: Forging Meaningful Industry Partnerships



Partnership Model

- **Structured Internships**
  Replace ad-hoc site visits with 24-month registered apprenticeships where students rotate through key departments (e.g., Metering, Substation Maintenance, Generation).
- **Industry Mentors**
  Assign each student a registered workplace practitioner responsible for signing off on a logbook of completed duties.
- **On-Site Training Centers**
  Establish 'school collie Eskom commission' or 'power city in school development plant' facilities where students learn on the same equipment they will use in the field, ensuring safety and relevance.

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Pillar 3: A Unified Portfolio for Seamless Certification

The Integrated Portfolio of Evidence (PoE) will include:

- **Academic Transcripts**
  Verified results for N1-N6 subjects from DHET.
- **Workplace Logbook**
  Signed-off evidence of practical competencies and completed tasks from industry mentors at City Power/Eskom.
- **Formative & Summative Assessments**
  Standardized practical lab tests and projects ('ISAT') co-designed with industry.
- **Trade Test Readiness**
  The completed PoE serves as the direct application and 'permit' for the final trade test, eliminating bureaucratic hurdles.

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Ready for Implementation: A Practical Project Plan

Project Objective	Main Activities	Outputs/M&E	Responsible Person	Estimated Costs
1: Curriculum Alignment	Engineering electrical assessment curriculum policy	2 Modules defined	Tshingombe Tshitadi	ZAR 50,000
	Develop integrated portfolio framework	12 Portfolio sections	Tshingombe Tshitadi	ZAR 50,000
2: Pilot Program Setup	Engineering studies assessment with partners	12 Student placements	Tshingombe Tshitadi	ZAR 50,000

This is not just an idea; it is a fully-costed project plan ready for submission and execution. It demonstrates an understanding of official processes for 'Monitoring and Evaluation (M&E),' 'Timeframes,' and 'Detailed Costs.'

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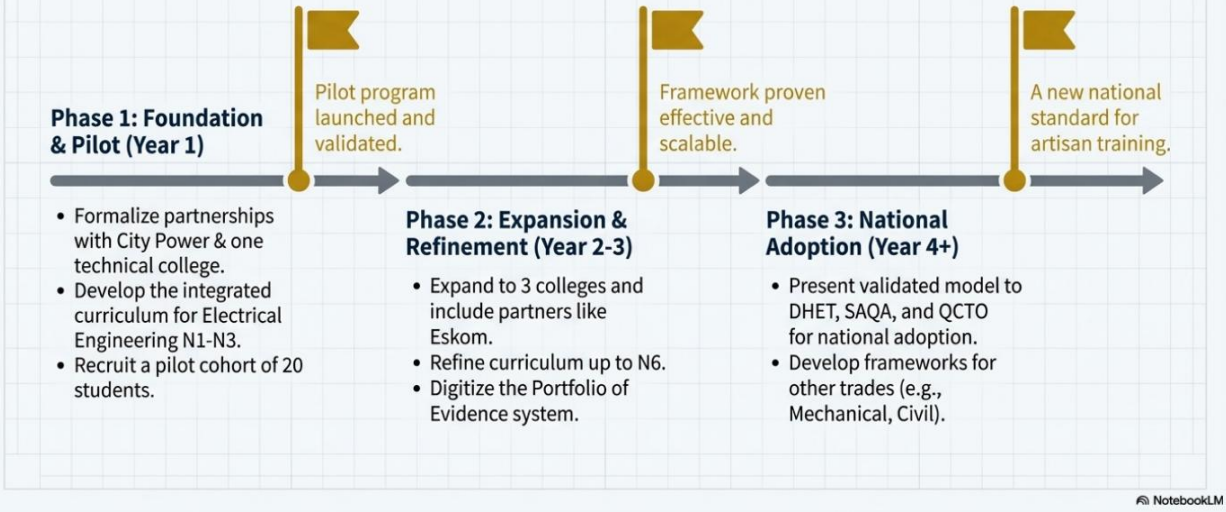
A Phased Roadmap to National Impact


Phase 1: Foundation & Pilot (Year 1)
Pilot program launched and validated.
Framework proven effective and scalable.
A new national standard for artisan training.
• Formalize partnerships with City Power & one technical college.
• Develop the integrated curriculum for Electrical Engineering N1-N3.
• Recruit a pilot cohort of 20 students.
Phase 2: Expansion & Refinement (Year 2-3)
• Expand to 3 colleges and include partners like Eskom.
• Refine curriculum up to N6.
• Digitize the Portfolio of Evidence system.
Phase 3: National Adoption (Year 4+)
• Present validated model to DHET, SAQA, and QCTO for national adoption.
• Develop frameworks for other trades (e.g., Mechanical, Civil).

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Seeking Partners to Build the Future of Engineering

The Ask

We are seeking foundational partners from government, industry, and academia to launch the pilot phase of this transformative framework.

Next Steps

1. Schedule a follow-up meeting to discuss the detailed implementation plan.
2. Form a joint steering committee to oversee the pilot program.
3. Secure seed funding to cover the initial project objectives outlined.

ANNEXURE J: PARTNERSHIP STATEMENT

Partner Organization	Representative	Signature

Project Lead/Initiator	Partner 1	Partner 2
Example foundational partners from government, industry, and academia to launch the pilot phase of this transformative framework. Example: Medium Grey Initiator (#6C757D)	Organization Name ..... Representative Name ..... Date ..... Signature	Organization Name ..... Representative Name ..... Date ..... Signature

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The Result: A Stronger Nation Through Skilled Hands

For Students

A clear path to a valuable, in-demand career.

For Industry

A reliable supply of competent, work-ready artisans, leading to higher quality, safer operations, and increased innovation.

For South Africa

A strengthened infrastructure, a more competitive economy, and the successful integration of youth into the Fourth Industrial Revolution.

"Every work done to perfection is done twice: once planned, once actual. The plan is complete. It is time to build."

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A Journey in Electrical Engineering: From Theory to Practice

EDUCATIONAL FRAMEWORK & QUALIFICATIONS

Mastery of the National Engineering Curriculum

Experience spans NATED qualifications (N1-N6) and the National Qualifications Framework (NQF).

EXTENSIVE STAKEHOLDER ENGAGEMENT

Final verification meeting included 39 participants across 13 professional and educational categories.

Stakeholder Classification	Invited	Attended
Workplace Practitioner	4	4
Professional Body	4	4
Education & Training Provider (Public & Private)	8	8

Purpose: To highlight the breadth of professional consultation for curriculum development, showing full participation from key sectors.

Research Focus: Bridging Education and Industry

Developed a research plan for a framework linking college training with industry needs.

TECHNICAL EXPERTISE & APPLICATION

Core Technical & Didactic Knowledge

Expertise in Electrotechnics, industrial Electronics, Mathematics, and critical safety standards like SANS 10142.

Practical Project Implementation

Engagement with industry leaders like City Power and Eskom through training and site visits.

ZAR 100,920.00
INVOICED FOR SERVICES

Billed for professional services including:

- Business engineering
- Marketing engineering

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A **Profile** in **Electrical Engineering:** Theory, Practice, and Innovation

ACADEMIC & FOUNDATIONAL KNOWLEDGE

National Diploma Pathway in Electrical Engineering

Completed N1-N6 subjects including Mathematics, Engineering Science, Electrotechnics, and Industrial Electronics.

High Aptitude for Technical Fields

Career assessment shows 100% match for Information Technology, Science, and Engineering.

Broad Subject Matter Expertise

Mastery of diverse topics including power machines, logic control, and panel wiring.

PRACTICAL APPLICATION & PROFESSIONAL EXPERIENCE

Gained Practical Experience with Industry Leaders

Involved in training and site visits with key entities like City Power and Eskom.

Authored a project to implement a new engineering curriculum and assessment policy.

Developed Technical Frameworks and Research Plans

Authored a project to implement a new engineering curriculum and assessment policy.

Provided Professional Engineering Consulting Services

Invoiced ZAR 100,220 for business and marketing engineering projects.

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Electrical Engineering Expertise: A Profile of Skills & Qualifications

FOUNDATIONAL EXPERTISE & QUALIFICATIONS

CERTIFIED IN NATED ELECTRICAL ENGINEERING (N1-N6)

Aligned with the South African Qualifications Authority (SAQA) NQF framework.

MASTERY OF CORE ENGINEERING PRINCIPLES

- MATHEMATICS
- ENGINEERING SCIENCE
- ELECTROTECHNICS
- INDUSTRIAL ELECTRONICS

KNOWLEDGE OF EDUCATIONAL & QUALITY FRAMEWORKS

Familiar with DHET, QCTO, and SAQA assessment and certification policies.

APPLIED SKILLS & FIELD EXPERIENCE

PRACTICAL EXPERIENCE WITH MAJOR POWER UTILITIES

Involves training, site visits, and project work with entities like City Power and Eskom.

PROFICIENT IN HANDS-ON ELECTRICAL WORK

- PANEL WIRING
- FAULT FINDING
- MOTOR CONTROL CIRCUIT INSTALLATION

ADHERENCE TO COMPULSORY SAFETY STANDARDS

Compliant with critical regulations like SANS 10142 for electrical installation safety.

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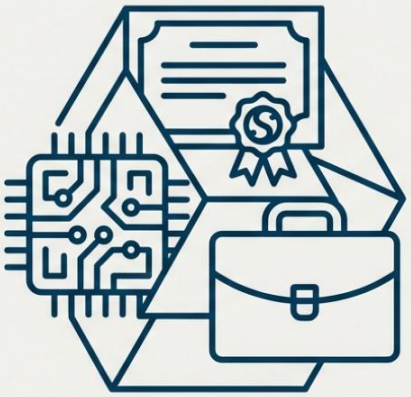
The Integrated Competency Framework

A Synthesis of Advanced Engineering Standards, Educational Assessment, and Professional Practice



Tshingombe Tshitadi

NotebookLM

The Competency Gap: Bridging Technical Standards and Verifiable Skill

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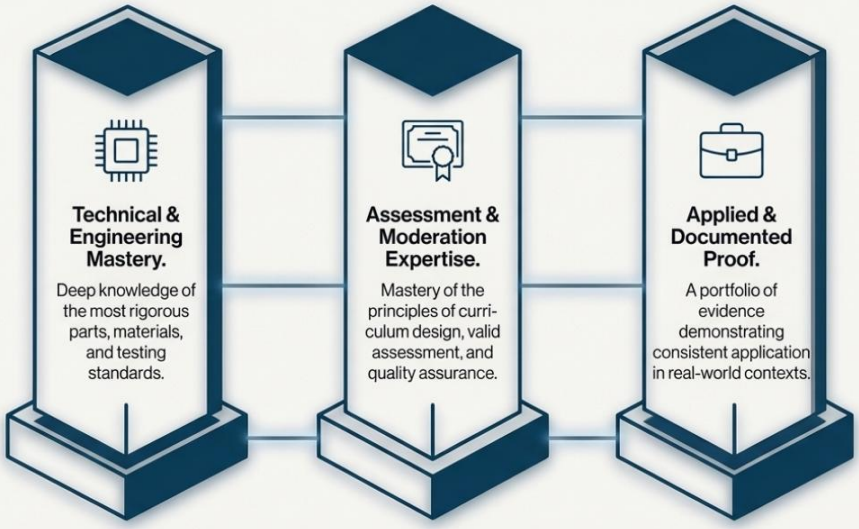
The Solution: An Auditable Framework for Holistic Mastery


Technical & Engineering Mastery.
Deep knowledge of the most rigorous parts, materials, and testing standards.
Assessment & Moderation Expertise.
Mastery of the principles of curriculum design, valid assessment, and quality assurance.
Applied & Documented Proof.
A portfolio of evidence demonstrating consistent application in real-world contexts.

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Pillar 1: Mastery of Component Lifecycle and Supply Chain Integrity (MIL-STD-11991B)

Key Concepts

Neue Haas Grotesk Display Pro, 65 Medium

- **Scope:** Management of Parts, Materials, and Processes (PM&P).
- **Core Functions:** COTS Evaluation, Counterfeit Prevention, and Lifecycle Management.
- **Key Principle:** Ensuring reliability, authenticity, and lifecycle management of all components.

Data in Action

Neue Haas Grotesk Display Pro, 65 Medium

Table 1: PM&P incoming inspection data requirements

	EEE parts	Mechanical parts	Materials
Database fields maintained for life of program	✓	✓	✓
Certificate of Conformance (C of C)	✓	✓	✓

Critical validation includes non-destructive testing such as **Radiological Inspection (X-ray)** for internal defects and **Particle Impact Noise Detection (PIND)** for detecting loose particles.

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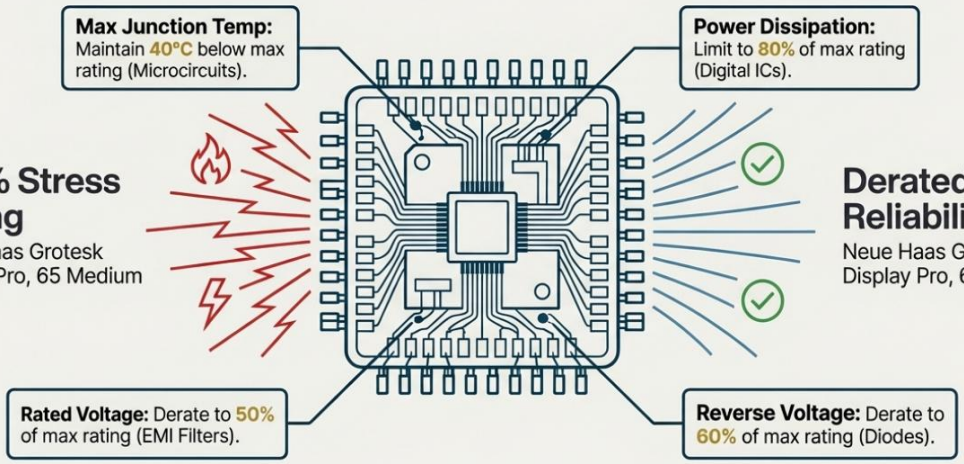
Pillar 1: Engineering for Durability: The Science of Derating


Max Junction Temp:
Maintain 40°C below max rating (Microcircuits).
Power Dissipation:
Limit to 80% of max rating (Digital ICs).
100% Stress Rating
Neue Haas Grotesk Display Pro, 65 Medium
Derated for Reliability
Neue Haas Grotesk Display Pro, 65 Medium
Rated Voltage: Derate to 50% of max rating (EMI Filters).
Reverse Voltage: Derate to 60% of max rating (Diodes).

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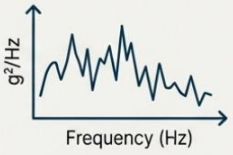
Pillar 1: Validating Performance Under Extreme Conditions (MIL-STD-202G)

Method 107G: Thermal Shock

Simulates extreme temperature changes from high to low.

Method 214A: Random Vibration

Ensures survival in operational environments (e.g., aircraft, vehicles).



Method 217A: Particle Impact Noise Detection (PIND)

Detects loose particles inside sealed components that could cause latent failures.

A single burst of particle noise = rejection.

Method 211A: Terminal Strength

Ensures terminals withstand mechanical stress during installation.

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Pillar 2: Expertise in National Qualification Frameworks & Assessment Policy

DHET (Department of Higher Education & Training)

↓

SAQA (South African Qualifications Authority)

Oversees the **NQF (National Qualifications Framework)**

↓

NATED / Report 191 Programs

↓

National N Diploma (NQF Level 6)

The Role of an Assessor/Moderator: Ensuring all assessments are **Fair**, **Valid**, **Reliable**, and **Practical**.

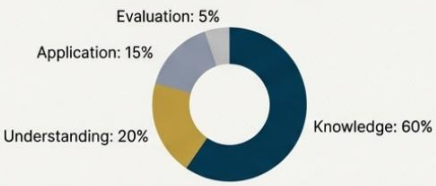
NotebookLM

Pillar 2: Engineering the Assessment: Weighting, Cognition, and Structure

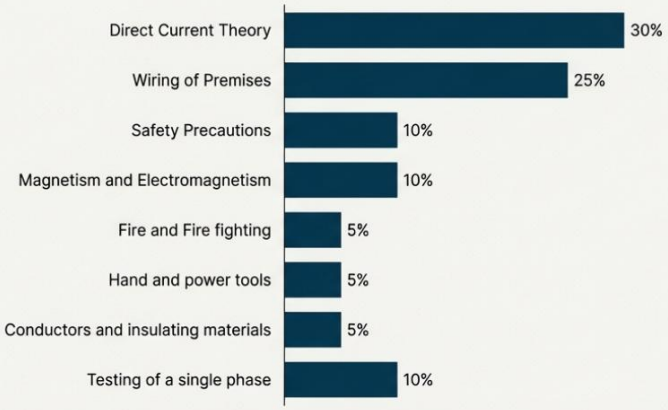
Source: Official Syllabus for Electrical Trade Theory N1 (2021)

ICASS Weighting

Cognitive Levels (Final Exam)



Module Weighting (%)


Direct Current Theory 30%
Wiring of Premises 25%
Safety Precautions 10%
Magnetism and Electromagnetism 10%
Fire and Fire fighting 5%
Hand and power tools 5%
Conductors and insulating materials 5%
Testing of a single phase 10%

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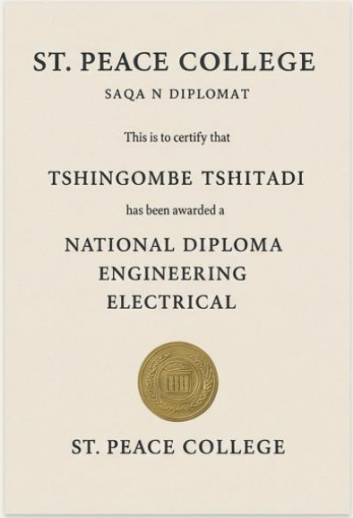
Pillar 3: Verifiable Proof: National N Diploma in Electrical Engineering

Mathematics
N1-N6

Engineering Science
N1-N4

Electrical Trade Theory
N1-N3



Industrial Electronics
N1-N6

Electrotechnics
N4-N6

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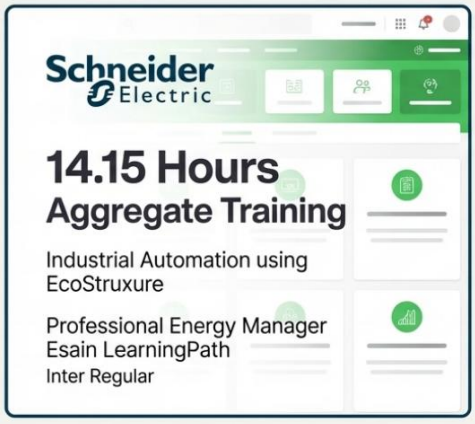
Pillar 3: Continuous Development with Industry Leaders



EATON
Career and University Certificate and Product of Profile Review
Neue Haas Grotesk Display Pro Medium
Skill Assessment: Stakeholder Communication (Expert)
Inter Bold

NotebookLM

Pillar 3: Application in High-Stakes Environments in Neue Haas Grotesk Display Pro 65 Medium

Eskom

Application Role:: Senior Technician (Civil & Electrical)

Relevance: Critical role in national infrastructure, requiring deep knowledge of compliance and technical standards.

SOUTH AFRICAN RESERVE BANK

Application Role: Manager, Security Systems Design and Applications

Relevance: Role demands highest levels of reliability, risk management, and system integrity for national security.

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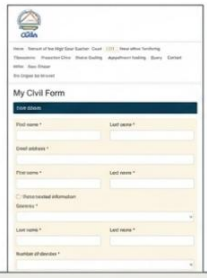
Pillar 3: Upholding Standards in Professional and Legal Arenas

CCMA & Labour Court

Focus: Unfair Dismissal Claims, Arbitration, Transcript Certiscript Certification.

Evidence: Cites case number GAJB6808-15.



PSIRA Complaint Records

Focus: Upholding Statutory Obligations (e.g., Private Security Sector Provident Fund).

Evidence: Cites failure to remit levy contributions as per Levies Collective Agreement.

Leveraging a deep understanding of compliance and documentation to ensure procedural fairness and uphold regulatory standards.

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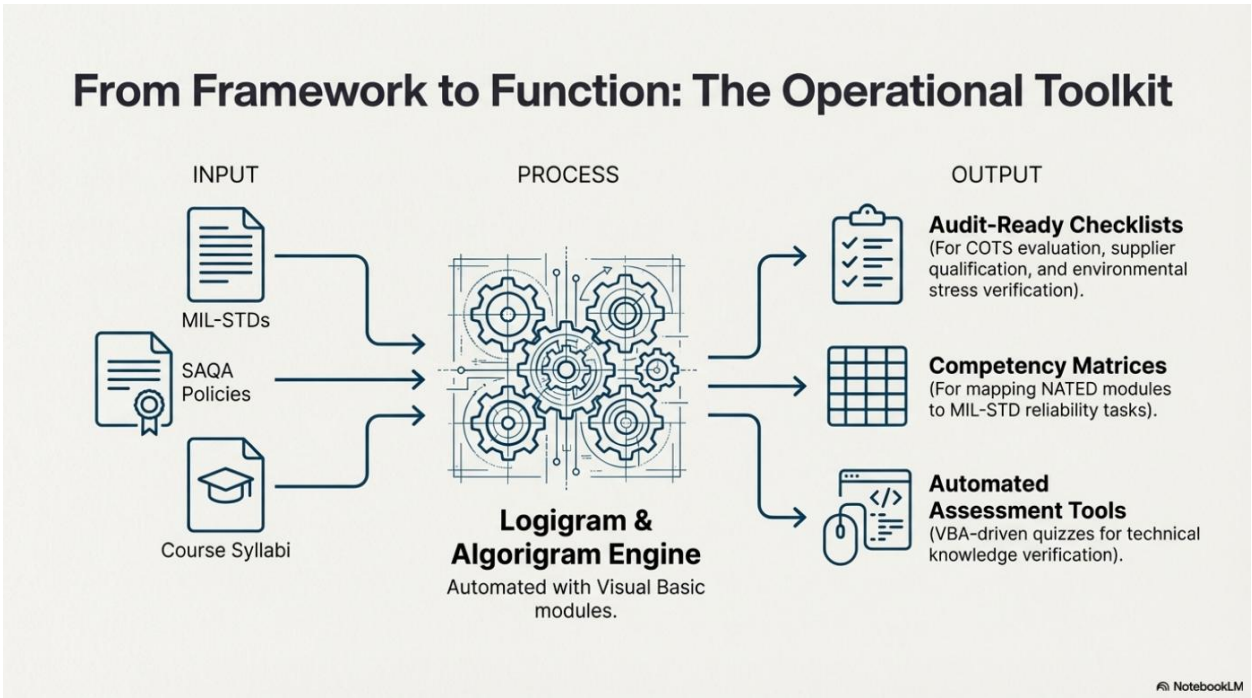
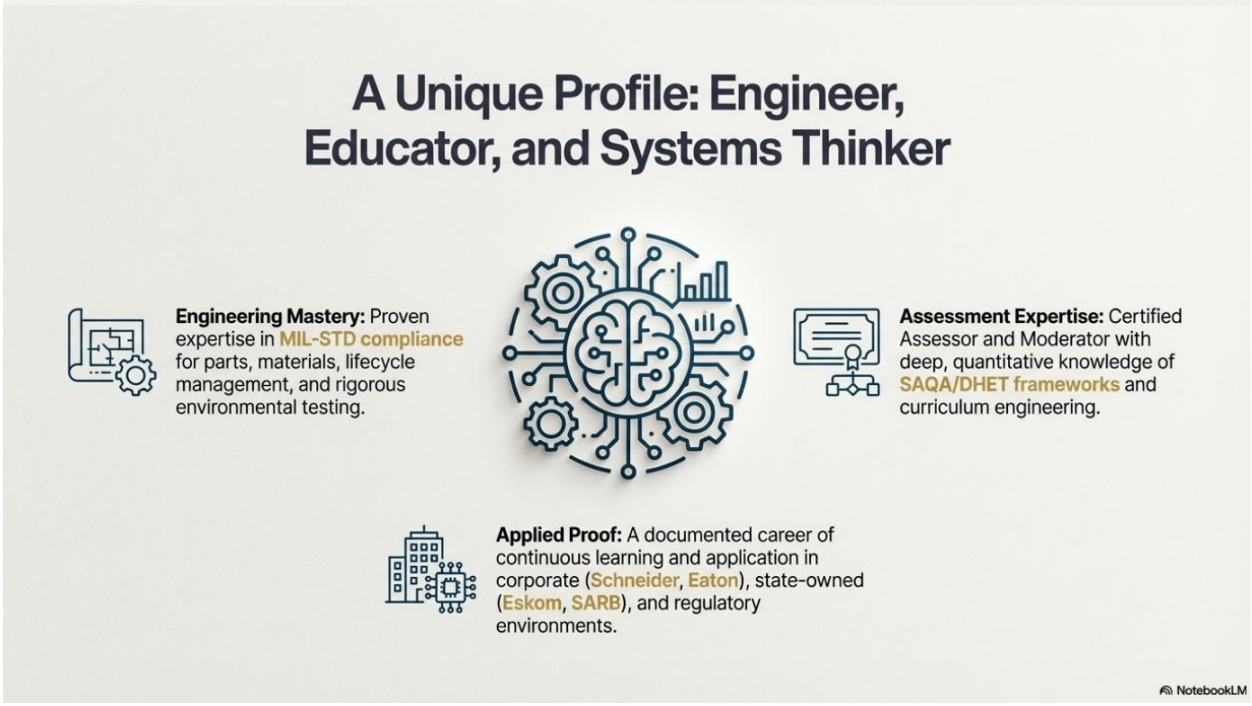

From Framework to Function: The Operational Toolkit
INPUT
PROCESS
OUTPUT
MIL-STDs
SAQA Policies
Course Syllabi
Logigram & Algorigram Engine
Automated with Visual Basic modules.
Audit-Ready Checklists
(For COTS evaluation, supplier qualification, and environmental stress verification).
Competency Matrices
(For mapping NATED modules to MIL-STD reliability tasks).
Automated Assessment Tools
(VBA-driven quizzes for technical knowledge verification).
NotebookLM


A Unique Profile: Engineer, Educator, and Systems Thinker
Engineering Mastery: Proven expertise in MIL-STD compliance for parts, materials, lifecycle management, and rigorous environmental testing.
Assessment Expertise: Certified Assessor and Moderator with deep, quantitative knowledge of SAQA/DHET frameworks and curriculum engineering.
Applied Proof: A documented career of continuous learning and application in corporate (Schneider, Eaton), state-owned (Eskom, SARB), and regulatory environments.
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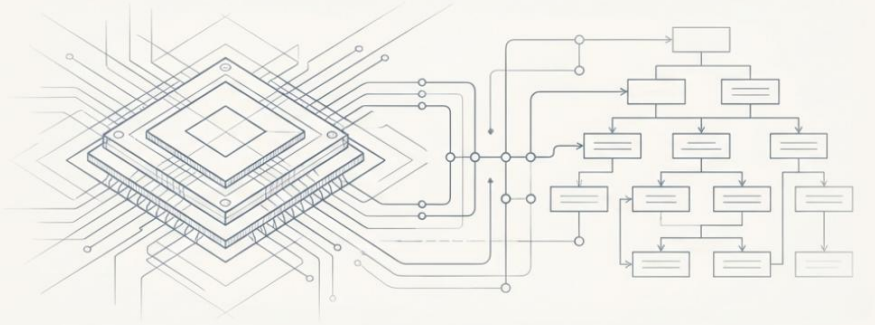
A Systems Approach to Integrating Engineering Standards and Educational Compliance

Leveraging deep expertise in military-grade engineering standards and national educational frameworks to build automated, audit-ready systems for quality, reliability, and workforce competence.



Tshingombe Tshitadi
ORCID: 0009-0005-2690-9559

NotebookLM

A Unified Framework Built on Three Pillars of Mastery

Engineering & Reliability Standards

Mastery of rigorous standards (MIL-STD, IEC, NIJ) for component reliability, testing, and lifecycle management.

Educational & Assessment Compliance

Deep knowledge of national qualification frameworks (SAQA/NQF) for curriculum design, assessment moderation, and credential integrity.

Systems Automation & Auditing

Designing and implementing automated tools (VBA, Logigrams) to ensure auditable compliance across technical and educational domains.

Foundation

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Foundational Expertise Begins with Rigorous Parts, Materials, & Processes (PM&P) Management

Mastery of MIL-STD-11991B provides the bedrock for ensuring reliability and authenticity in military systems. This standard defines the requirements for managing components from development through sustainment.

PM&P Incoming Inspection Data Requirements (MIL-STD-11991B, Appendix H)

Requirement	EEE Parts	Mechanical Parts	Materials	Key Notes
Database Fields Maintained	Yes	Yes	Yes	Lot date code, C of C data
Documented Procedures	Yes	Yes	Yes	Define sampling, methods, criteria
Radiological Inspection	As applicable	Yes	–	Internal defect detection
Destructive Physical Analysis (DPA)	Categories A–B	–	–	Per MIL-STD-1580
Certificate of Conformance (C of C)	Yes	Yes	Yes	Include FTIR, XRF, ASTM tests

Why It Matters

This systematic approach to inspection ensures component traceability and prevents counterfeit parts from entering the supply chain—a principle directly applicable to maintaining the integrity of academic records.

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Component Reliability is Ensured Through Precise Application of Derating Factors

Beyond inspection, long-term reliability is achieved by operating components well below their maximum specified limits. These derating factors are critical for preventing preventing premature failure in high-stress environments.

Table 1. Microcircuit Derating Factors (MIL-STD-11991B, Table AVI)

Critical Stress Parameter	Digital	Linear
Maximum Supply Voltage	0.90	0.80
Power Dissipation	0.80	0.75
Max Junction Temperature	40°C below max	40°C below max

Table 2. Capacitor Derating Factors (MIL-STD-11991B, Table AI)

Type	Voltage Derating Factor	Max Case Temperature
Ceramic / Glass / Plastic Film	0.50	20°C below max
Tantalum, Solid	0.50	70°C / 110°C
Aluminum Electrolytic	Not allowed	Not allowed

Why It Matters

Applying these mathematical rules is non-negotiable for mission-critical hardware. It represents a rule-based system of quality control that mirrors the structured credit and assessment rules within educational frameworks.

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Verifying System Integrity Relies on Standardized Environmental and Mechanical Test Methods

Component and system robustness is validated through repeatable, documented test procedures outlined in standards like MIL-STD-202G. These methods simulate real-world stresses from handling, vibration, and shock.

Terminal Strength (Method 211A)

Purpose: Ensures terminals withstand mechanical stress.

Tests: Pull (Tensile), Bend, Twist (Torsion), Torque.

Key Parameter: Specifies forces (e.g., 0.5 to 20 lbs) and cycles.

Particle Impact Noise Detection (PIND) (Method 217A)

Purpose: Detects free-moving contaminants in sealed devices.

Process: Uses a shaker, ultrasonic transducer, and oscilloscope.

Outcome: A single burst of particle noise results in rejection.

Random Vibration (Method 214A)

Purpose: Determines ability to withstand operational vibration.

Test Conditions: Standardized curves (e.g., Power Spectral Density of 0.02 to 1.50 g^2/Hz).

Why It Matters

These methods provide objective, evidence-based proof of quality. The requirement for traceable mounting fixtures and documented procedures is analogous to the need for standardized assessment tools and moderation reports in education.

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Educational Compliance is Governed by the National Qualifications Framework (NQF)

The South African Qualifications Authority (SAQA) and Department of Higher Education & Training (DHET) define the rules for qualifications, assessment, and moderation, ensuring national standards of competence.

Table 1: ICASS Assessment Structure (Report 191)

Component	Weighting	Minimum to Qualify	Validity
Test 1	30%	40%	1 Year
Test 2	70%	40%	1 Year

Table 2: Module Weighting: Electrical Trade Theory N1

Module	Weight Value (%)
Direct Current Theory	30%
Wiring of Premises	25%
Safety Precautions	10%
Magnetism & Electromagnetism	10%
Other Modules	25%

Department
Higher Education
and Training
Republic of South Africa

SAQA

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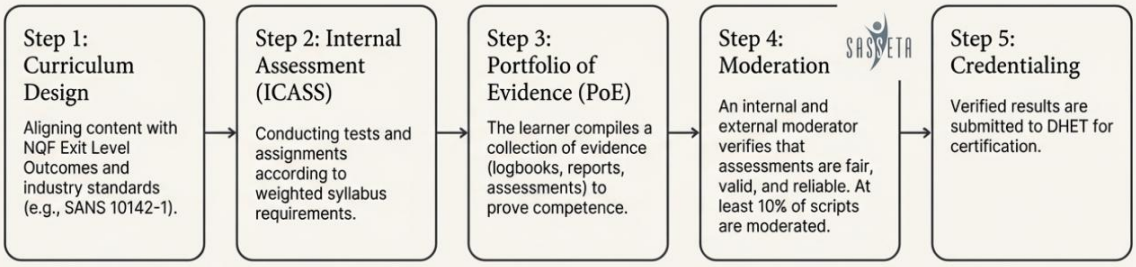
The Integrity of Qualifications is Maintained Through Rigorous Assessment and Moderation


Step 1: Curriculum Design
Aligning content with NQF Exit Level Outcomes and industry standards (e.g., SANS 10142-1).
Step 2: Internal Assessment (ICASS)
Conducting tests and assignments according to weighted syllabus requirements.
Step 3: Portfolio of Evidence (PoE)
The learner compiles a collection of evidence (logbooks, reports, assessments) to prove competence.
Step 4: Moderation
An internal and external moderator verifies that assessments are fair, valid, and reliable. At least 10% of scripts are moderated.
Step 5: Credentialing
Verified results are submitted to DHET for certification.

Why It Matters

The Portfolio of Evidence serves the same function as an engineering design history file. It is a curated, auditable record that provides traceable proof of competence against a defined standard.

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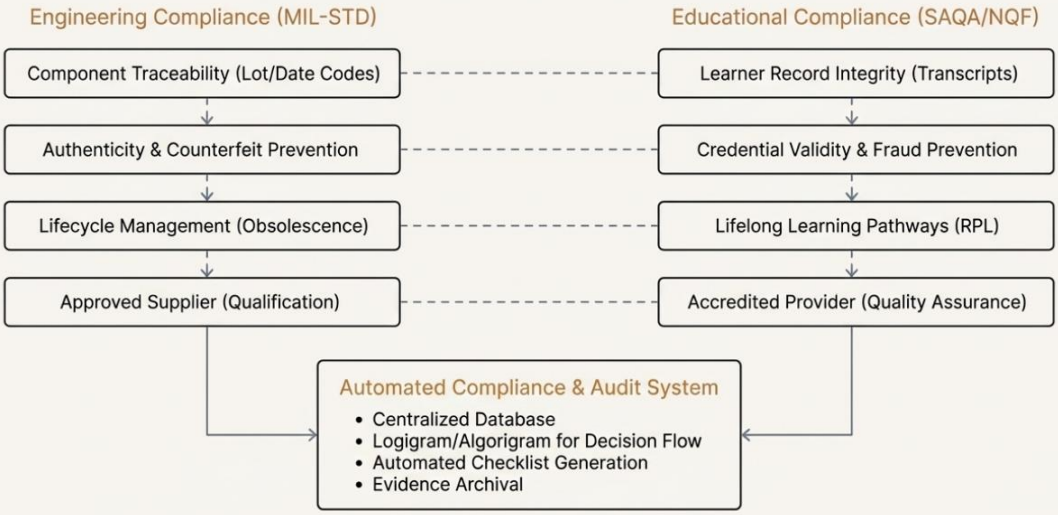
Engineering Reliability and Educational Validity Share a Common Systemic DNA



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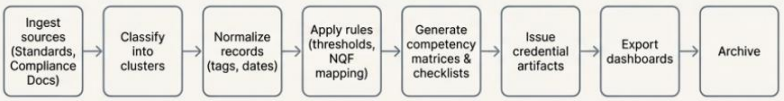
Automation is Achieved by Translating Compliance Rules into Code and Logic

The principles of compliance can be encoded into repeatable, scalable tools using VBA and logical diagrams, creating systems that manage evidence, automate assessment, and generate audit-ready documentation.

The Logic (Algorigram)



The Data Model (VBA Snippet)

```
VBA Data Model for Source Management

Public Enum ClusterType
    ctStandards = 1
    ctCompliance = 2
    ctCorporate = 3
    ctProjects = 4
End Enum

Public Type SourceItem
    Id As Long
    Title As String
    Tags As String
    DateStamp As Date
    Cluster As ClusterType
End Type
```

Why It Matters

This is not just about programming; it's about systems architecture. By structuring disparate data types (from MIL-STDs to SAQA policies) into a unified model, we can build a single tool to manage and audit them.

Automated Systems Can Generate Dynamic Tools for Competency Assessment

This VBA-powered diagnostic quiz demonstrates how curriculum requirements can be transformed into an interactive assessment tool, complete with question logic, answer validation, and explanatory feedback.

Diagnostic Quiz: Integrated Compliance

Question 1

Which South African regulatory body oversees the National Qualifications Framework (NQF)?

- A) DHET
- C) QCTO
- B) SAQA (selected)
- D) MERSETA

Correct: B) SAQA. SAQA manages the NQF, ensuring standardization of qualifications.

Question 2

What material in military connectors poses a corrosion risk in severe environments?

- A) Nickel-plated aluminum (selected)
- B) Passivated stainless steel
- C) Tin-plated brass
- D) Stainless steel

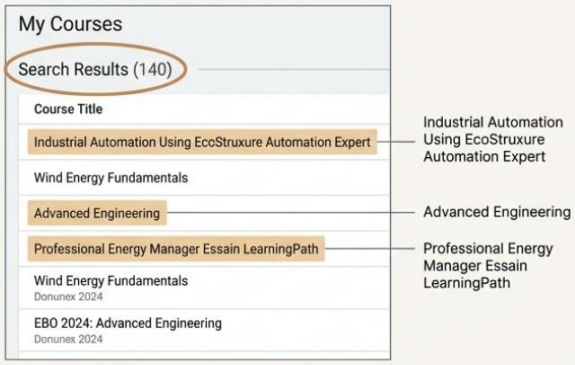
Correct: A) Nickel-plated aluminum. Nickel-plated aluminum suffers corrosion/mechanical risks in severe environments.

Logic:
`If Answer = Correct Then
Score++ -> Log 'Correct' Else
Log 'Incorrect' with explanation`

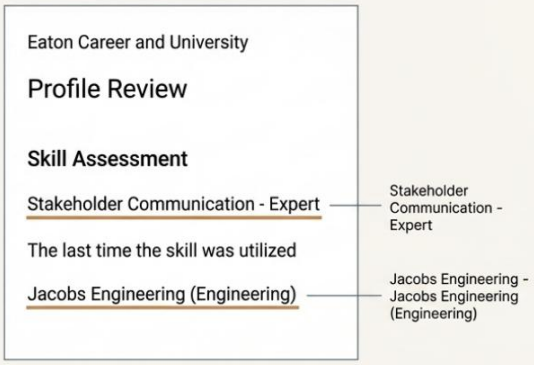
Expertise is Validated Through Continuous Learning and Engagement with Industry Leaders

Applying engineering and systems thinking in corporate environments requires continuous upskilling and a commitment to industry best practices, as demonstrated by engagement with global leaders in energy management and electrical engineering.

Schneider Electric



Eaton


Eaton Career and University
Profile Review
Skill Assessment
Stakeholder Communication - Expert
The last time the skill was utilized
Jacobs Engineering (Engineering)
Stakeholder Communication - Expert
Jacobs Engineering - Jacobs Engineering (Engineering)

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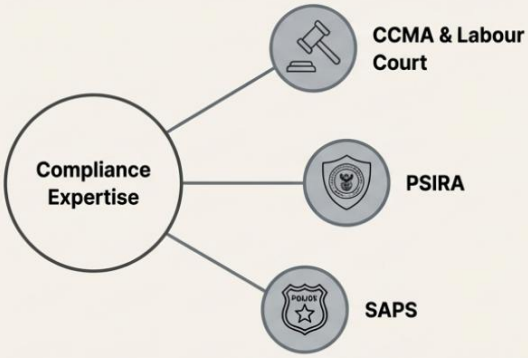
Mastery of Compliance is Proven in High-Stakes Regulatory and Legal Arenas

The ultimate test of compliance expertise lies in navigating formal regulatory and legal systems. This involves meticulous documentation, evidence management, and argumentation across multiple state and private sector bodies.



- **CCMA & Labour Court:** Managing proceedings involving unfair dismissal claims, arbitration outcomes, and transcript certification, requiring formal evidence submission (Case Ref GAJB6808-15).
- **PSIRA (Private Security Industry Regulatory Authority):** Filing and managing formal complaint records against employers regarding statutory obligations and provident fund contributions.
- **SAPS (South African Police Service):** Interfacing with law enforcement, including providing witness statements and documentation for investigations.

Why It Matters

This experience demonstrates not just theoretical knowledge of rules, but the practical resilience and meticulous attention to detail required to enforce compliance and defend rights within formal legal frameworks.

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Technical Proficiency is Kept Current with Certifications in AI and Modern Development Tools

Staying relevant requires mastery of the tools that are shaping the future of engineering and automation. These Microsoft credentials demonstrate proficiency in AI, developer productivity, and cloud solutions.

GitHub Copilot Tools Achievements

Implement code improvements

Develop unit tests

Develop code features

Generate documentation

Completed Microsoft Training Courses

- Plan and prepare to develop AI solutions on Azure
- Develop an AI App with the Azure AI Foundry SDK
- Explore AI for All
- Boost your productivity with Microsoft Copilot

943 Modules Completed

216 Learning Paths Completed

756+ Training Hours

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A Comprehensive Portfolio of Evidence is Available for Review

Every claim made in this presentation is backed by a deep and organized portfolio of primary-source documents, providing an auditable trail of qualifications, experience, and accomplishments.

Academic Credentials

- DHET / SAQA National N Diploma Transcripts
- St. Peace College Certificates

Professional Moderation

- SASSETA Assessor & Moderator Records
- ICASS / ISAT Moderation Reports

Corporate Training

- Schneider Electric Learning Transcript (140+ entries)
- Eaton University Profile & Skill Assessments

Technical Certifications

- Microsoft AI & GitHub Copilot Badges/Transcripts

Legal & Regulatory Filings

- CCMA Arbitration Records
- PSIRA Complaint Forms

Engineering Standards Analysis

- Comparative Reports (MIL-STD vs. IEC)
- Technical Checklists & Derating Tables

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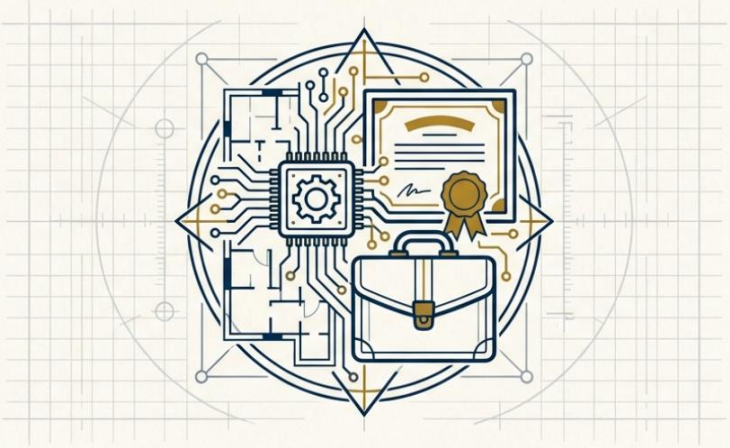
The Integrated Competency Framework

A Synthesis of Advanced Engineering Standards, Educational Assessment, and Professional Practice



Tshingombe Tshitadi

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The Competency Gap: Bridging Technical Standards and Verifiable Skill

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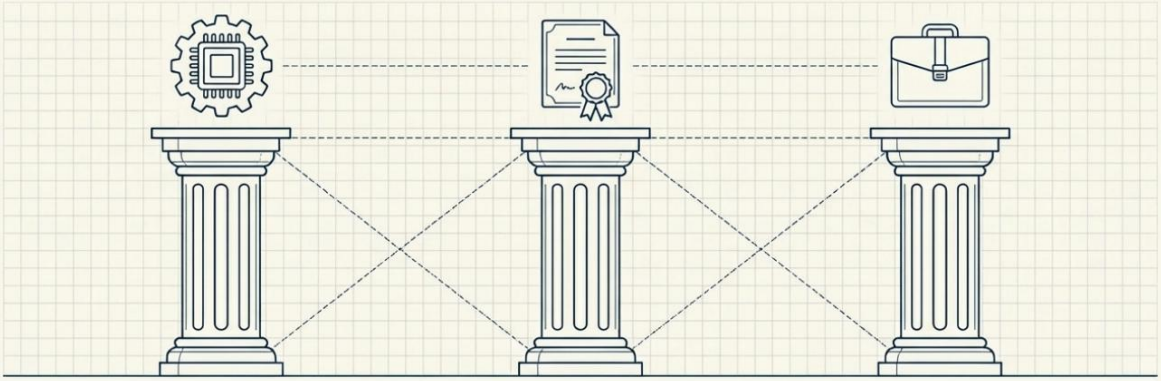
The Solution: An Auditable Framework for Holistic Mastery



Technical & Engineering Mastery
Deep knowledge of the most rigorous parts, materials, and testing standards.

Assessment & Moderation Expertise
Mastery of the principles of curriculum design, valid assessment, and quality assurance.

Applied & Documented Proof
A portfolio of evidence demonstrating consistent application in real-world contexts.

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Pillar 1: Mastery of Component Lifecycle and Supply Chain Integrity (MIL-STD-11991B)

Key Concepts

- **Scope:** Management of Parts, Materials, and Processes (PM&P).
- **Core Functions:** COTS Evaluation, Counterfeit Prevention, and Lifecycle Management.
- **Key Principle:** Ensuring reliability, authenticity, and lifecycle management of all components.

Data in Action

Table 1: PM&P Incoming Inspection Data Requirements

Requirement	EEE parts	Mechanical parts	Materials
Requirement: Database fields maintained for life of program	Yes	Yes	Yes

Requires non-destructive testing like Radiological Inspection (X-ray) for internal defects and PIND for detecting loose particles.

Mandates a Certificate of Conformance (C of C) for all parts and materials.

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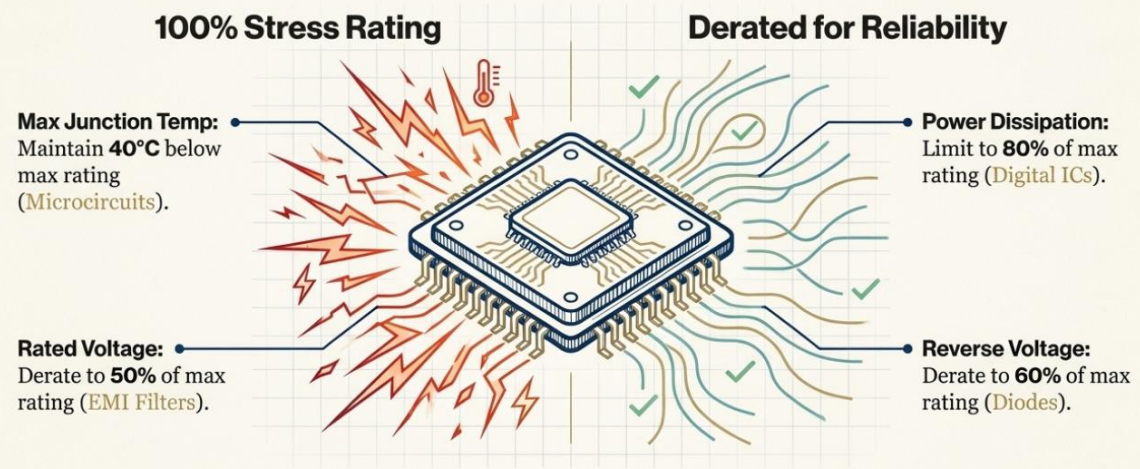
Pillar 1: Engineering for Durability: The Science of Derating


100% Stress Rating
Derated for Reliability
Max Junction Temp: Maintain 40°C below max rating (Microcircuits).
Power Dissipation: Limit to 80% of max rating (Digital ICs).
Rated Voltage: Derate to 50% of max rating (EMI Filters).
Reverse Voltage: Derate to 60% of max rating (Diodes).

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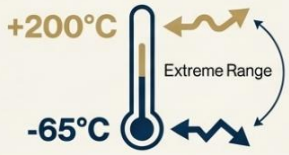
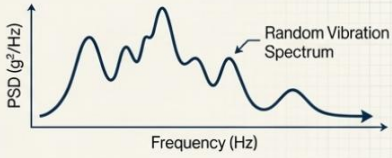
Pillar 1: Validating Performance Under Extreme Conditions (MIL-STD-202G)

Method 107G: Thermal Shock
Simulates extreme temperature changes from high to low.



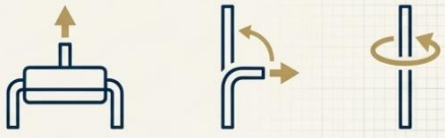
Method 214A: Random Vibration
Ensures survival in operational environments (e.g., aircraft, vehicles).



Method 217A: Particle Impact Noise Detection (PIND)
Detects loose particles inside sealed components that could cause latent failures.

A single burst of particle noise = rejection

Method 211A: Terminal Strength
Ensures terminals withstand mechanical stress during installation.



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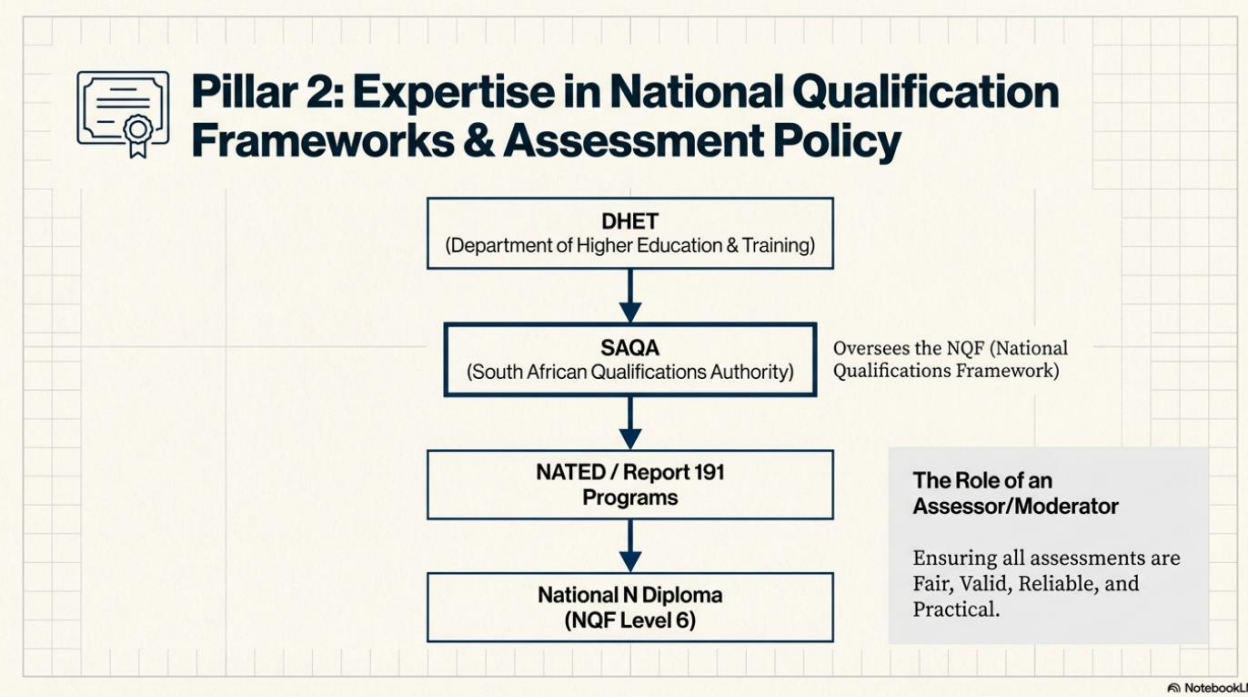
Pillar 2: Expertise in National Qualification Frameworks & Assessment Policy
DHET
(Department of Higher Education & Training)
SAQA
(South African Qualifications Authority)
Oversees the NQF (National Qualifications Framework)
NATED / Report 191 Programs
National N Diploma (NQF Level 6)
The Role of an Assessor/Moderator
Ensuring all assessments are Fair, Valid, Reliable, and Practical.
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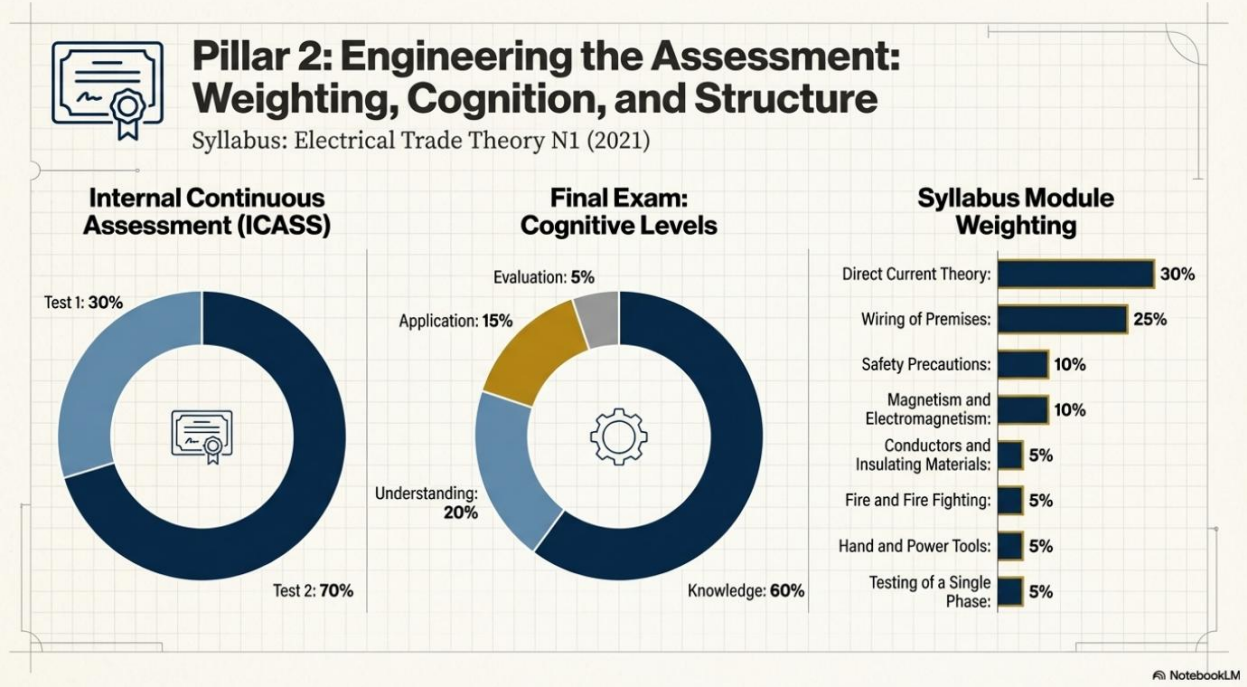
Pillar 2: Engineering the Assessment: Weighting, Cognition, and Structure
Syllabus: Electrical Trade Theory N1 (2021)
Internal Continuous Assessment (ICASS)
Test 1: 30%
Test 2: 70%
Final Exam: Cognitive Levels
Evaluation: 5%
Application: 15%
Understanding: 20%
Knowledge: 60%
Syllabus Module Weighting
Direct Current Theory: 30%
Wiring of Premises: 25%
Safety Precautions: 10%
Magnetism and Electromagnetism: 10%
Conductors and Insulating Materials: 5%
Fire and Fire Fighting: 5%
Hand and Power Tools: 5%
Testing of a Single Phase: 5%
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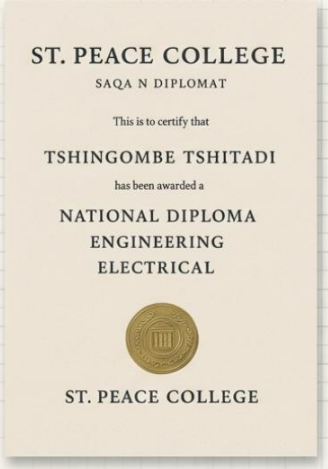
Pillar 3: Verifiable Proof: National N Diploma in Electrical Engineering

Mathematics N1-N6

Engineering Science N1-N4

Electrical Trade Theory N1-N3



Industrial Electronics N1-N6

Electrotechnics N4-N6

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Pillar 3: Continuous Development with Industry Leaders

Schneider Electric

14.15 Hours Aggregate Training

Industrial Automation using EcoStruxure

Professional Energy Manager Esain LearningPath

EATON

Career and University Certificate and Product of Profile Review

Stakeholder Communication (Expert)

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Pillar 3: Application in High-Stakes Environments

Eskom

Application Role: Senior Technician (Civil & Electrical)

Relevance: Critical role in national infrastructure, requiring deep knowledge of compliance and technical standards.

SOUTH AFRICAN RESERVE BANK SARB

Application Role: Manager, Security Systems Design and Applications

Relevance: Role demands highest levels of reliability, risk management, and system integrity for national security.

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Pillar 3: Upholding Standards in Professional and Legal Arenas

CCMA & Labour Court

- **Focus:** Unfair Dismissal Claims, Arbitration, Transcript Certification.
- **Evidence:** References case numbers such as **GAJB6808-15**.

PSIRA Complaint Records

- **Focus:** Upholding Statutory Obligations (e.g., Private Security Sector Provident Fund).
- **Evidence:** Cites failure to 'remit all levy contributions' as per the Levies Collective Agreement.

Leveraging a deep understanding of compliance and documentation to ensure procedural fairness and uphold regulatory standards.

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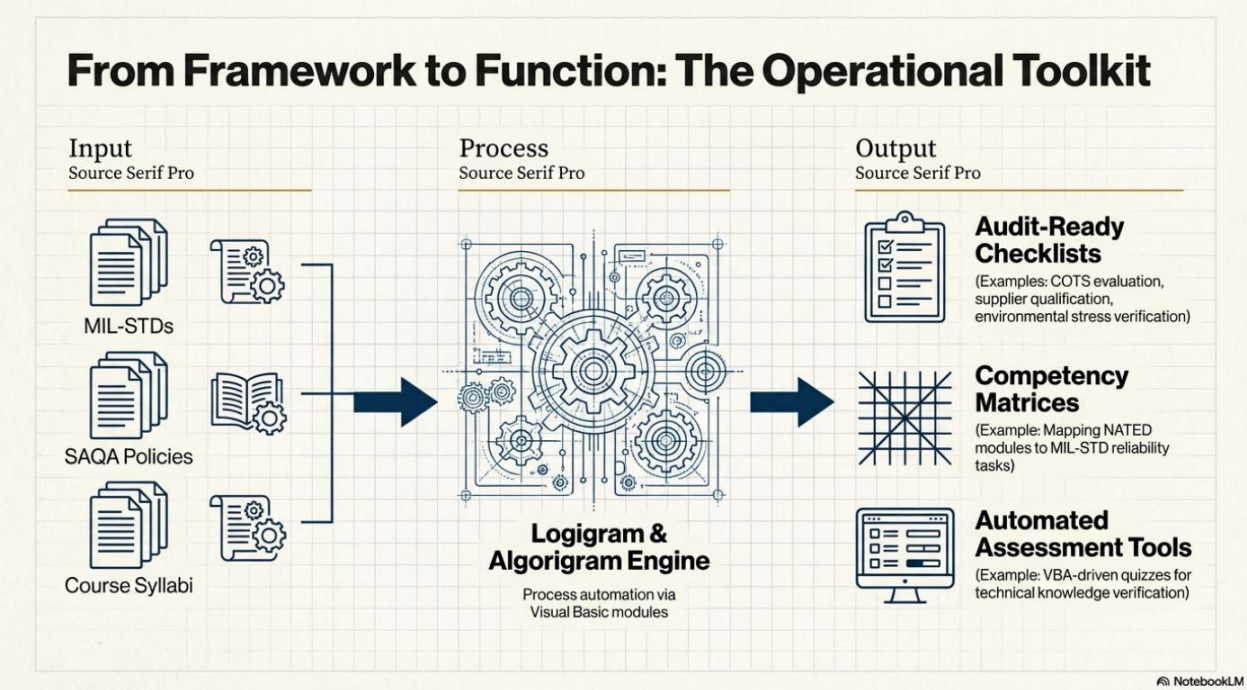
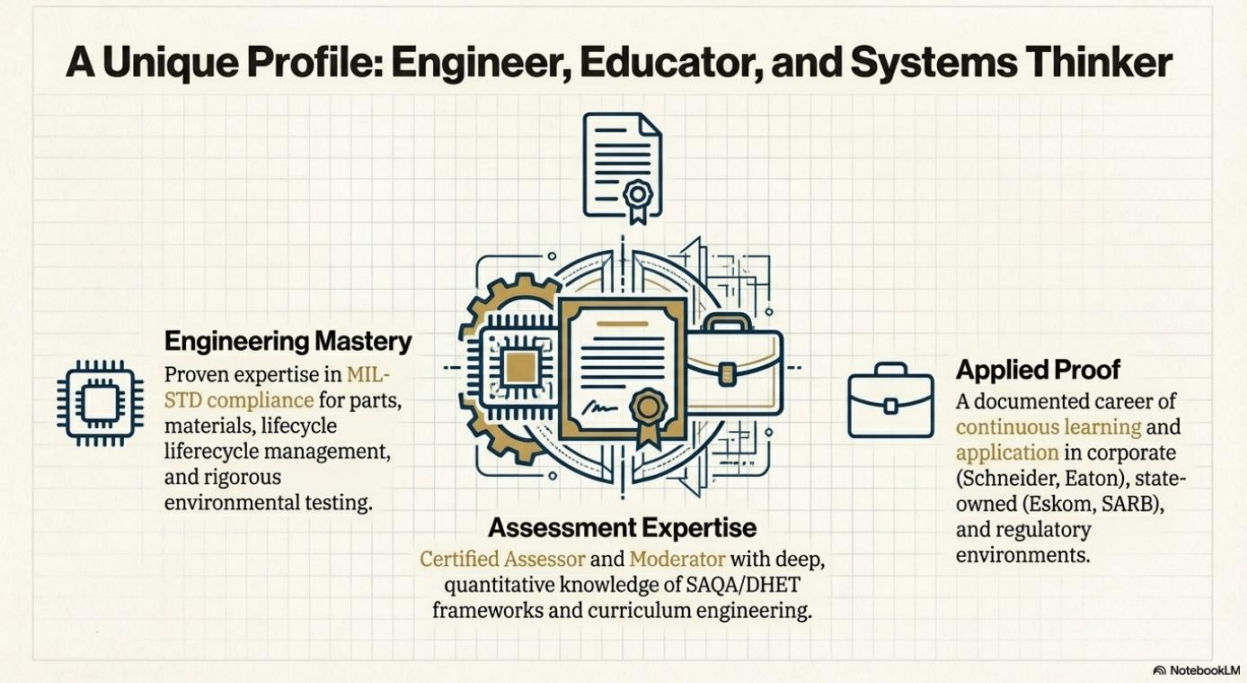

From Framework to Function: The Operational Toolkit
Input
Source Serif Pro
Process
Source Serif Pro
Output
Source Serif Pro
MIL-STDs
SAQA Policies
Course Syllabi
Logigram & Algorigram Engine
Process automation via Visual Basic modules
Audit-Ready Checklists
(Examples: COTS evaluation, supplier qualification, environmental stress verification)
Competency Matrices
(Example: Mapping NATED modules to MIL-STD reliability tasks)
Automated Assessment Tools
(Example: VBA-driven quizzes for technical knowledge verification)
NotebookLM


A Unique Profile: Engineer, Educator, and Systems Thinker
Engineering Mastery
Proven expertise in MIL-STD compliance for parts, materials, lifecycle liferecycle management, and rigorous environmental testing.
Assessment Expertise
Certified Assessor and Moderator with deep, quantitative knowledge of SAQA/DHET frameworks and curriculum engineering.
Applied Proof
A documented career of continuous learning and application in corporate (Schneider, Eaton), state-owned (Eskom, SARB), and regulatory environments.
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Contact & Further Information

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Email: tshingombefiston@gmail.com

LinkedIn Profile: [URL Placeholder]

Available to discuss applications of this framework for curriculum design, design, compliance auditing, or technical team development.

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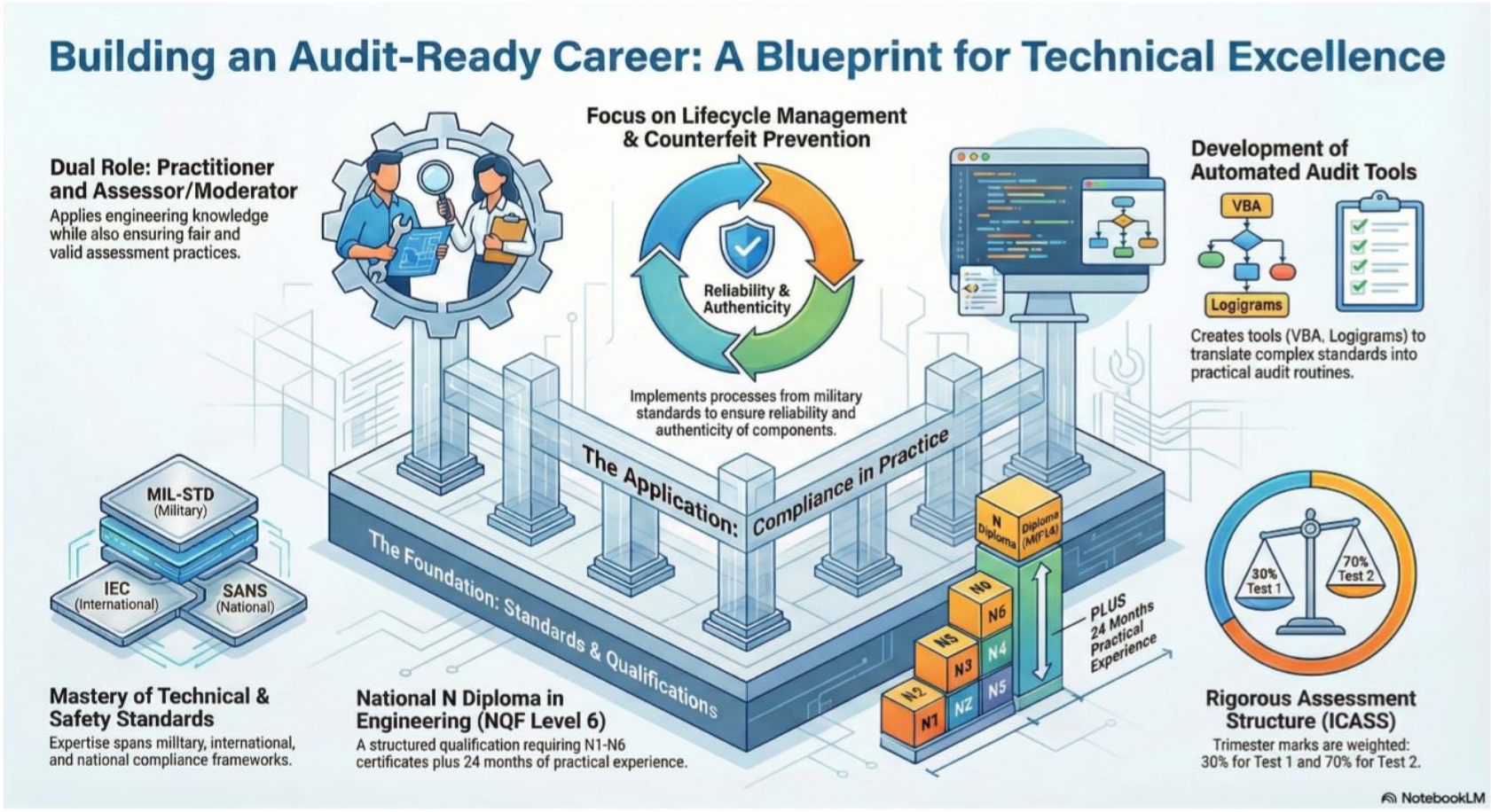
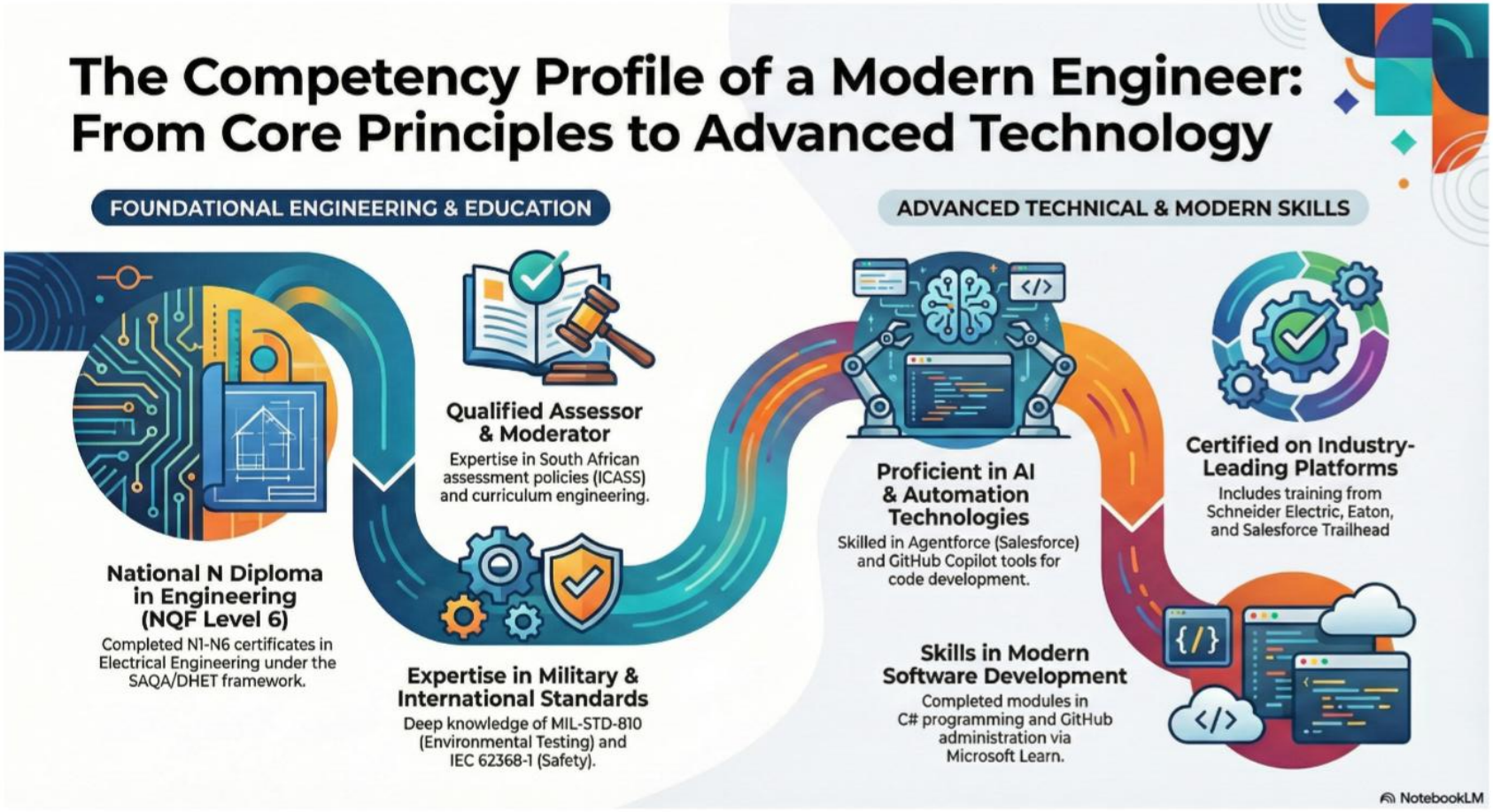
Building an Audit-Ready Career: A Blueprint for Technical Excellence


Dual Role: Practitioner and Assessor/Moderator
Applies engineering knowledge while also ensuring fair and valid assessment practices.
Focus on Lifecycle Management & Counterfeit Prevention
Reliability & Authenticity
Implements processes from military standards to ensure reliability and authenticity of components.
Development of Automated Audit Tools
VBA
Logigrams
Creates tools (VBA, Logigrams) to translate complex standards into practical audit routines.
The Application: Compliance in Practice
The Foundation: Standards & Qualifications
MIL-STD (Military)
IEC (International)
SANS (National)
N Diploma
Diploma (MrTL4)
N0
N6
N3
N4
N2
N1
NZ
N5
PLUS 24 Months Practical Experience
30% Test 1
70% Test 2
Mastery of Technical & Safety Standards
Expertise spans milltary, international, and national compliance frameworks.
National N Diploma in Engineering (NQF Level 6)
A structured qualification requiring N1-N6 certificates plus 24 months of practical experience.
Rigorous Assessment Structure (ICASS)
Trimester marks are weighted: 30% for Test 1 and 70% for Test 2.
NotebookLM


The Competency Profile of a Modern Engineer: From Core Principles to Advanced Technology
FOUNDATIONAL ENGINEERING & EDUCATION
ADVANCED TECHNICAL & MODERN SKILLS
National N Diploma in Engineering (NQF Level 6)
Completed N1-N6 certificates in Electrical Engineering under the SAQA/DHET framework.
Qualified Assessor & Moderator
Expertise in South African assessment policies (ICASS) and curriculum engineering.
Expertise in Military & International Standards
Deep knowledge of MIL-STD-810 (Environmental Testing) and IEC 62368-1 (Safety).
Proficient in AI & Automation Technologies
Skilled in Agentforce (Salesforce) and GitHub Copilot tools for code development.
Certified on Industry-Leading Platforms
Includes training from Schneider Electric, Eaton, and Salesforce Trailhead
Skills in Modern Software Development
Completed modules in C# programming and GitHub administration via Microsoft Learn.
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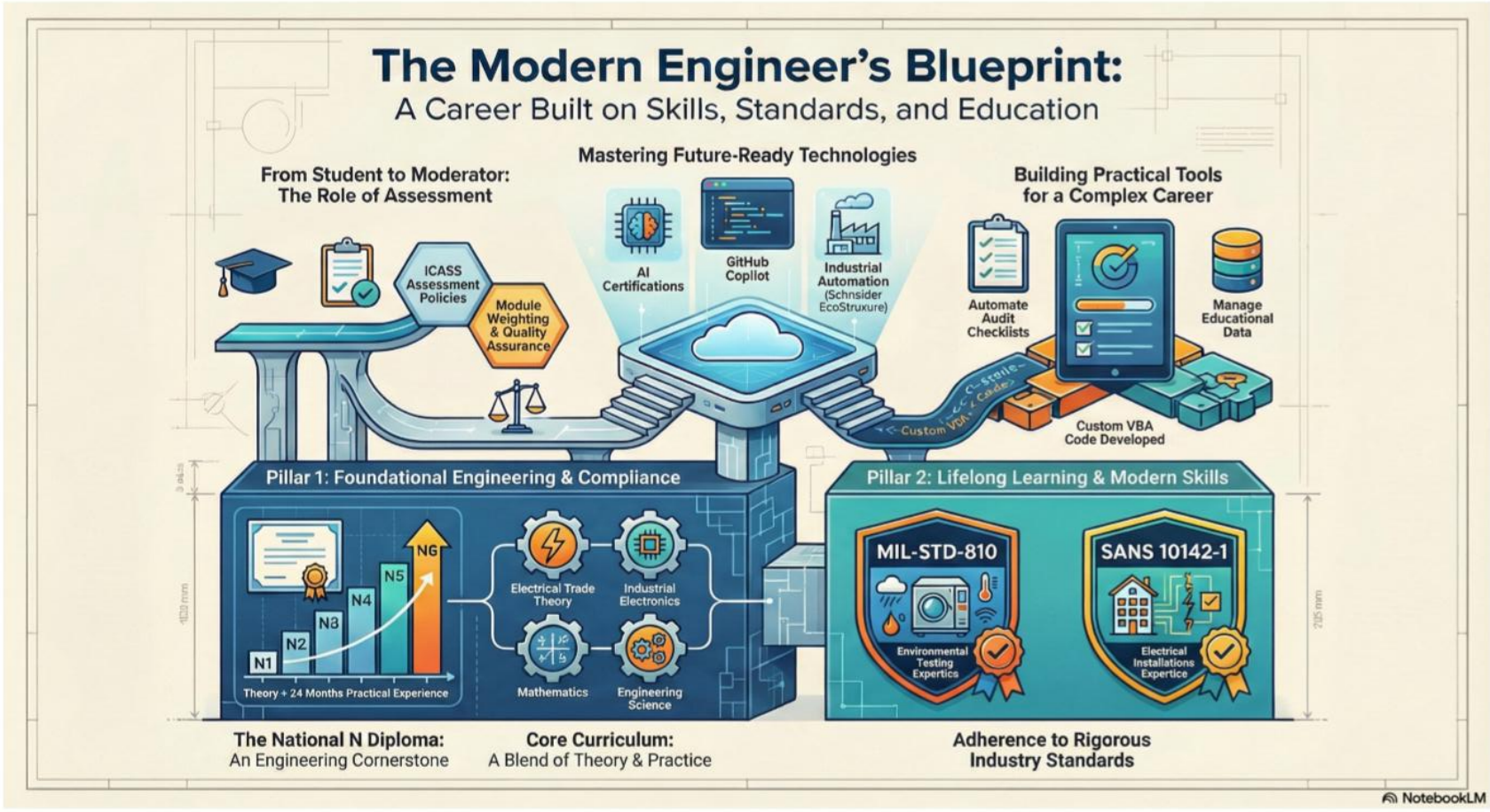
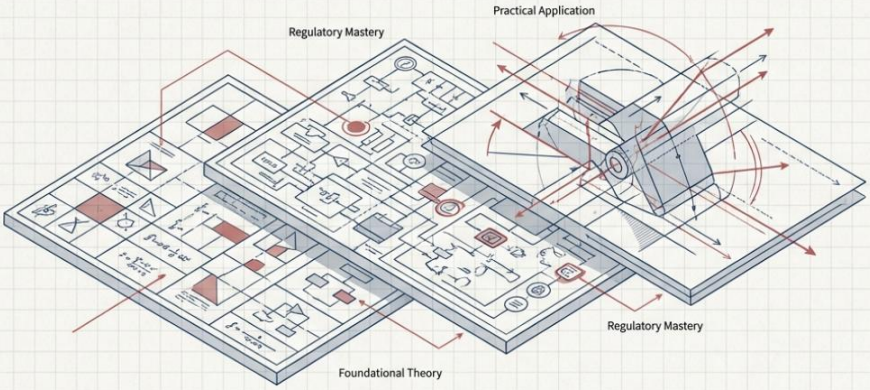

The Modern Engineer's Blueprint:
A Career Built on Skills, Standards, and Education
From Student to Moderator: The Role of Assessment
ICASS Assessment Policies
Module Weighting & Quality Assurance
Mastering Future-Ready Technologies
AI Certifications
GitHub Copilot
Industrial Automation (Schnsider EcoStruxure)
Building Practical Tools for a Complex Career
Automate Audit Checklists
Manage Educational Data
Custom VBA Code Developed
Pillar 1: Foundational Engineering & Compliance
N1
N2
N3
N4
N5
N6
Theory + 24 Months Practical Experience
Electrical Trade Theory
Industrial Electronics
Mathematics
Engineering Science
Pillar 2: Lifelong Learning & Modern Skills
MIL-STD-810
Environmental Testing Expertics
SANS 10142-1
Electrical Installations Expertice
The National N Diploma:
An Engineering Cornerstone
Core Curriculum:
A Blend of Theory & Practice
Adherence to Rigorous Industry Standards
NotebookLM

The Anatomy of a Modern Engineer

A Case Study in the Synthesis of Foundational Theory, Regulatory Mastery, and Practical Application.



This presentation deconstructs the capabilities of a world-class engineering professional, demonstrating that true expertise lies at the intersection of academic knowledge, mastery of complex standards, and proven application.

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The Case Study: Tshingombe Tshitadi

To understand the modern engineering professional, we will analyze the career and qualifications of Tshingombe Tshitadi. His journey provides a blueprint for integrating South Africa's rigorous educational frameworks with the demanding standards of global engineering compliance and the practical challenges of the workplace.

- **National N Diploma in Engineering (NQF Level 6)**
- **Demonstrated Expertise in US Military & International Standards (MIL-STD, IEC)**
- **Registered SASSETA Assessor and Moderator**

Pillar I: Building on a Foundation of Verifiable Academic Theory

Excellence begins with a robust, nationally recognized education. The South African Qualifications Authority (SAQA) and the Department of Higher Education and Training (DHET) provide the framework for this foundation.

Evidence Box 1: Qualification Details

Qualification Title
National N Diploma Engineering

SAQA Qualification ID
90674

NQF Level
6 (360 Credits)

Quality Assurance
QCTO (Quality Council for Trades and Occupations)

Evidence Box 2: Transcript Synthesis

Learner Name
Tshingombe Tshitadi

SAQA Asset ID
09121

Institutional Code
30_39

Most Recent DHET Submission
Status: Submitted (2024-02-12)

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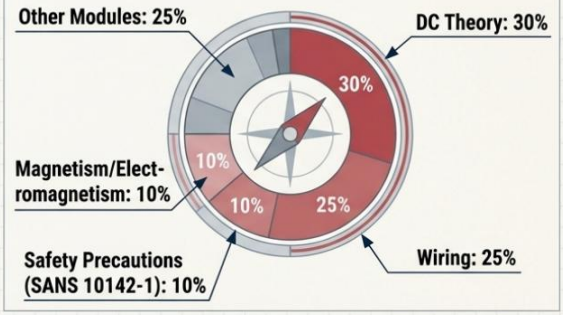
Deconstructing the Engineering Curriculum: From N4 to N6

The National N Diploma is achieved through a progressive series of certificates (N4, N5, N6), ensuring a comprehensive understanding of both core principles and advanced applications.

N4-N6 Subject Progression

Level	Key Subjects
N4	Mathematics, Engineering Science, Industrial Electronics
N5	Electro-technics, Digital Electronics, Power Machines
N6	Supervisory Management, Control Systems, Installation Rules, Specialised Electric Codes

Core Module Weighting (Electrical Trade Theory N1)



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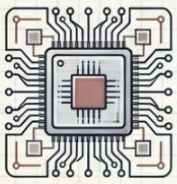
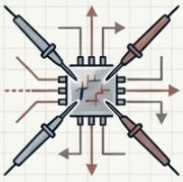
Pillar II: Achieving Mastery Over High-Stakes Regulatory Standards

Theoretical knowledge must be tested against the world's most rigorous compliance frameworks. US Military Standards (MIL-STDs) represent the gold standard for ensuring reliability, safety, and performance in critical systems. Mastery of these standards is non-negotiable for high-stakes engineering.

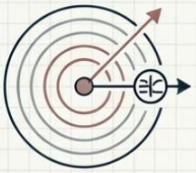
THE GAUNTLET



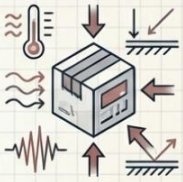
MIL-STD-11991B: Parts, Materials, and Processes (PM&P) Management



MIL-STD-202G: Test Methods for Electronic and Electrical Component Parts



MIL-STD-461: Electromagnetic Interference (EMI) Control



MIL-STD-810: Environmental Engineering Considerations

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Evidence of Mastery: Managing Parts, Materials, and Processes (MIL-STD-11991B)

Effective engineering requires stringent control over every component. MIL-STD-11991B mandates a comprehensive system for PM&P management, including detailed incoming inspection procedures to prevent counterfeit parts and ensure quality.

Excerpt from Appendix F, Table FI (Electronic Components Inspection)

Test/Inspection	Indicators	Purpose
Documentation Check	Spelling/grammar errors, omissions	Detect fake documentation
Marking Permanency	Removal of ink marking	Detect remarked parts
Surface Finish (Acetone)	Removal of coating, sanding marks	Detect blacktopped parts
X-ray (Radiological)	Inconsistent die size/leadframe	Detect incorrect die/wrong parts

Insight

This level of scrutiny goes far beyond a simple visual check. It requires a systematic, evidence-based process to ensure supply chain integrity and prevent catastrophic system failures from a single counterfeit component.

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Ensuring Reliability Under Stress: The Science of Component Derating

Mastery extends to predicting and preventing failure. Derating—operating components below their maximum specified ratings—is a critical engineering discipline that dramatically increases system reliability and lifespan. MIL-STD-11991B provides precise derating factors.

Distilled Derating Factors (from MIL-STD-11991B, Appendix A)

Table 1: Microcircuit Derating Factors

Parameter	Digital	Linear
Max Supply Voltage	0.90	0.80
Power Dissipation	0.80	0.75
Max Junction Temp.	40°C below max	40°C below max

Table 2: Capacitor Derating Factors

Type	Voltage Factor	Note
Aluminum Electrolytic	Not allowed	Requires specific approval
Ceramic / Glass / Film	0.50	Standard for high-rel
Tantalum, Solid	0.50 (non-surge)	Surge-tested required

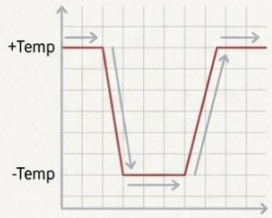
Insight

Applying these factors is not a suggestion; it's a core requirement. It demonstrates an understanding of how electrical and thermal stresses impact component life, directly linking design choices to mission success.

NotebookLM

Proving Resilience: Environmental and Mechanical Stress Testing (MIL-STD-202G)

Components must survive the environments in which they operate. MIL-STD-202G defines standardized test methods to ensure electronics can withstand severe thermal shock, vibration, and mechanical stress, simu-latiizing entire operational lifecycles.



Thermal Shock
(Method 107G, Table 107I)

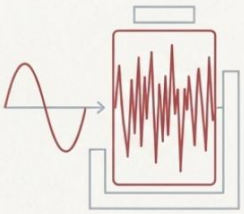
- **Profile A:** -55°C ↔ +85°C
- **Profile B:** -65°C ↔ +125°C
- **Profile F:** -65°C ↔ +150°C

(Cycles: 5, 25, 50, or 100)

Random Vibration
(Method 214A, Table 214I)

- **Test Condition B:** 7.56 Grms
- **Test Condition D:** 11.95 Grms
- **Test Condition G:** 23.91 Grms

(Durations: 3 min up to 8 hours)



Insight

This is not just about ruggedization. It's about data-driven assurance. Specifying and interpreting these tests requires a deep understanding of physics, materials science, and failure analysis.

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Connecting the Dots: How Foundational Theory Enables Regulatory Mastery

The rigorous standards of MIL-STDs are not learned in a vacuum. They are applied extensions of the fundamental principles taught in the engineering curriculum. This is where theory becomes practice.

DHET Curriculum
Module: Electrical Trade Theory: DC Principles (30% weight)
Concept: Ohm's Law, Power Dissipation, Component Behavior

Informs the practical application of... →

MIL-STD Requirement
Standard: MIL-STD-11991B, Table AIII
Application: Calculating Diode Derating Factors (Forward Current: 0.50, Power: 0.50) to prevent thermal runaway.

DHET Curriculum
Subject: Engineering Science N4
Concept: Material Properties, Coefficients of Thermal Expansion

Is essential for interpreting... →

MIL-STD Requirement
Standard: MIL-STD-202G, Method 107G
Application: Understanding failure modes during Thermal Shock testing due to CTE mismatch.

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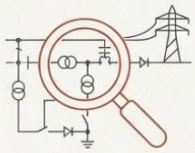
Pillar III: The Proving Ground of Practical Application

Expertise is ultimately validated in the field. The visit by NATED engineering students to City Power, Johannesburg's municipal utility, provided a complex operational environment to apply and assess curriculum knowledge against real-world infrastructure and challenges.

Job Shadowing: Observing and participating in day-to-day tasks within the Metering, Test Branch, and Customer Service units.



Site Inspection: Assessing technical standards (e.g., SANS 10142) at substations and metering points.

Curriculum Validation: Engaging with City Power staff to align NATED syllabi with current industry practices, including smart metering and renewable energy integration.

Portfolio Development: Collecting evidence of workplace activities for the National Trade Portfolio.

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The Synthesis of Expertise: The Role of the Assessment Moderator

The ultimate demonstration of mastery is the ability to fairly and accurately assess the competence of others. As a registered SASSETA Assessor and Moderator, one must possess a comprehensive command of both the educational framework (DHET/SAQA) and the practical standards of the industry.

Key Responsibilities of a Moderator

- Review assessment tasks for technical accuracy, content coverage, and fairness.
- Verify that assessments align with national curriculum standards (SAQA unit standards).
- Ensure consistency and reliability in marking across multiple assessors.
- Provide feedback to uphold the quality and credibility of the qualification.

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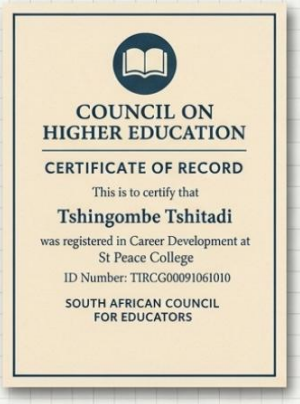
A Portfolio of Verifiable Credentials

Each credential represents a milestone in the journey of integrating theory, mastery, and application, validated by national and professional bodies.


COUNCIL ON HIGHER EDUCATION
CERTIFICATE OF RECORD
This is to certify that
Tshingombe Tshitadi
was registered in Career Development at St Peace College
ID Number: TIRCG00091061010
SOUTH AFRICAN COUNCIL FOR EDUCATORS

Recognition within South Africa's highest academic oversight body.

Schneider Electric South Africa
ECSA PORTAL CERTIFICATE
This is to certify that
Tshingombe Tshitadi
was registered in CPD at St Peace College
ID Number: TIRCG00091061010
SOUTH AFRICAN COUNCIL FOR EDUCATORS

Engagement with the Engineering Council of South Africa, the statutory body for the profession.

Certified competence in assessment and quality assurance for the safety and security sector.

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Extending Impact: From Personal Mastery to Systemic Contribution

True expertise is not siloed; it is shared to elevate the entire professional ecosystem. Contributions to educational and development initiatives bridge the gap between industry and academia for the next generation.

Sci-Bono
Discovery Centre

Key Contribution: Sci-Bono Journer Expert Assessment Library

- **Objective:** Support Science, Technology, Engineering, Arts, and Mathematics (STEAM) education in South Africa and the SADC region.
- **Outputs:**
  - Developed resources and workshops for **Digital CV Writing** to enhance learner employability.
  - Provided guidance and materials for **Learner Job Preparation**, interview skills, and workplace integration.
  - Authored **Technical Documentation** and assessment briefs for electrical engineering.

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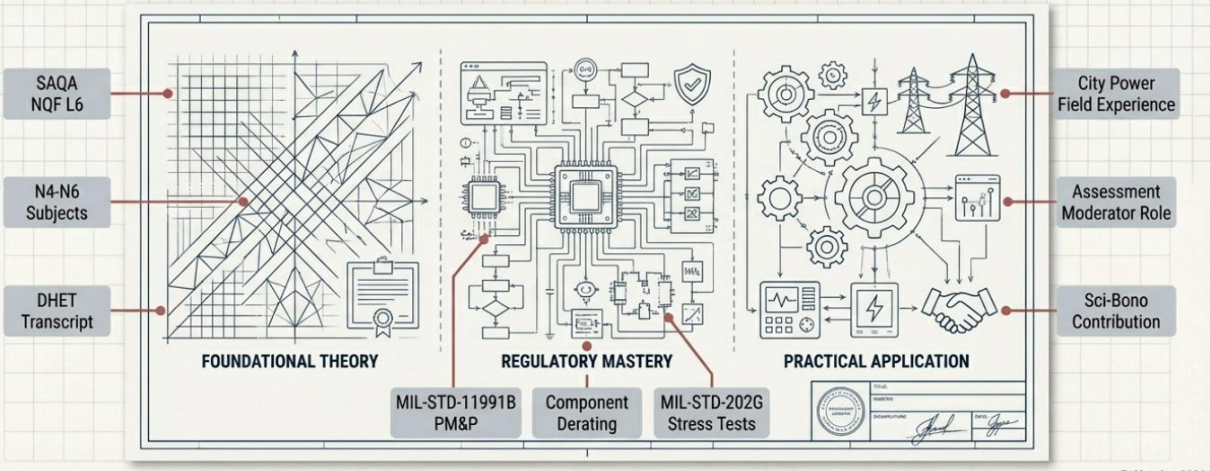
The Blueprint for Engineering Excellence

The case of Tshingombe Tshitadi provides a clear and replicable blueprint for the modern engineer. It is a model built on a verifiable foundation of theory, hardened by the mastery of exacting global standards, and proven through practical application and contribution.



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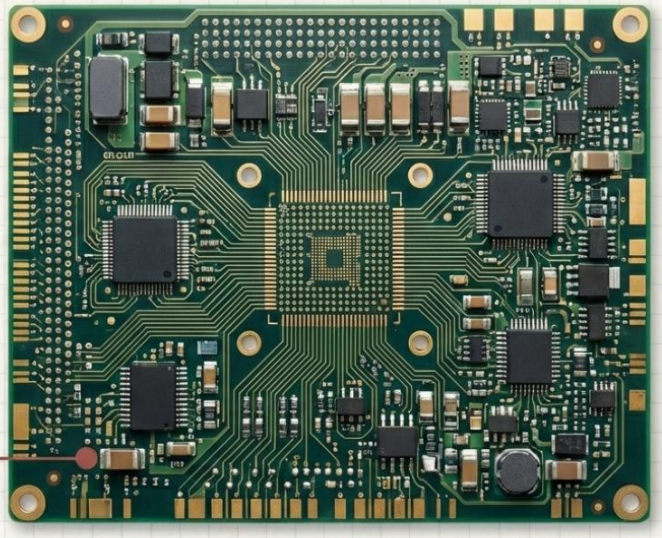
Integrated Expertise is the Bedrock of Reliable Systems

In a world of increasing complexity, the safety, reliability, and innovation of our critical systems systems depend not on specialists in isolated domains, but on integrated professionals who can navigate the entire lifecycle from theory to application. The standard for engineering is not just knowledge, but **synthesis.**



NotebookLM

The Learner's Journey Begins

Meet Tshingombe Tshitadi. His journey from student to expert provides a unique lens through which to understand the ecosystem of modern engineering.

The National N Diploma, a South African NQF Level 6 qualification, is the culmination of this foundational stage.

The Rules of the Game: South Africa's National Qualifications Framework (NQF)

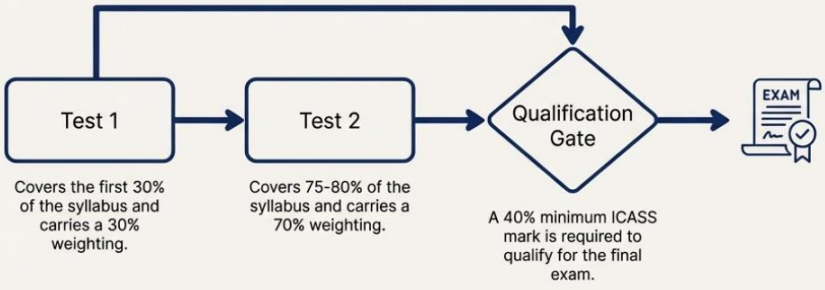
The NQF provides a structured, credible system for all education and training in South Africa. The National N Diploma is a significant milestone within this framework.

Progression to the National N Diploma (SAQA ID 90674)

NotebookLM

Measuring Mastery: The Internal Continuous Assessment (ICASS) Framework

For NATED Engineering Studies (Report 191), progress is measured through a structured Internal Continuous Assessment (ICASS) process. A minimum term mark is required to even qualify for the final national examination.


Test 1
Test 2
Qualification Gate
EXAM
Covers the first 30% of the syllabus and carries a 30% weighting.
Covers 75-80% of the syllabus and carries a 70% weighting.
A 40% minimum ICASS mark is required to qualify for the final exam.

The Role of the Assessment Moderator

All assessment instruments and a sample of marked scripts are reviewed by a subject matter expert to ensure fairness, validity, and consistency, a role our protagonist will later assume.

NotebookLM

The Rosetta Stone of Reliability: MIL-STD-11991B

This standard establishes the general requirements for managing Parts, Materials, and Processes (PM&P) across the entire lifecycle of military systems, from development to sustainment.

Supplier Control

Mandates the use of approved or authorized suppliers to ensure authenticity and reliability. Defines a broker as a high-risk, unauthorized source.

Lifecycle Management

Establishes a proactive approach to component obsolescence, derating for reliability, and data retention for the life of the program.

Threat Mitigation

Requires documented processes for counterfeit prevention, corrosion control (CPC), and electrostatic discharge (ESD) protection.

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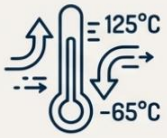
Engineering for Reality: Surviving Environmental and Mechanical Stresses

Components for critical systems are not just designed to function; they are rigorously tested to survive the harsh realities of their operational environment, as defined by standards like MIL-STD-202G and MIL-STD-810.



Thermal Shock (Method 107G)

Subjects components to extreme temperature shifts (e.g., -65°C to +125°C) in under 10 seconds to test material integrity.

Random Vibration (Method 214A)

Simulates the intense, multi-frequency vibrations experienced during launch or on aircraft, measuring endurance endurance up to 46 G RMS.

Particle Impact Noise Detection (PIND) (Method 217A)

Uses a shaker and ultrasonic transducer to detect loose particulate contaminants inside sealed cavity devices that could cause latent failures.

Random Drop (Method 203C)

Simulates repeated impacts from handling and service by tumbling the component in a steel cage for 45 minutes.

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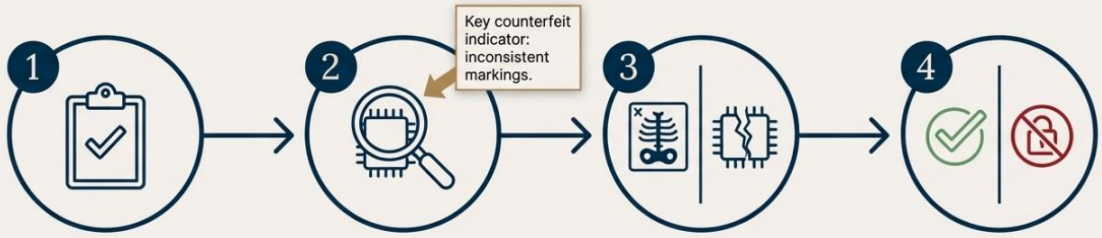
The First Line of Defense: Auditing Incoming Components

Based on MIL-STD-11991B, a multi-stage inspection process is critical to preventing counterfeit and defective parts from entering the supply chain.



Receive

Verify supplier authorization and check the Certificate of Conformance (C of C) for inaccuracies or omissions.

Screen

Perform external visual inspection for defects and conduct marking permanency tests using mineral spirits spirits and acetone to detect remarked or blacktopped parts.

Analyze

Conduct radiological (X-Ray) inspection to check for inconsistent die sizes and lead frames. Perform

Destructive Physical Analysis (DPA) and Particle Impact Noise Detection (PIND) on a sample basis for high-reliability components.

Disposition

Accept conforming parts and commit records to the database. Quarantine non-conforming parts and initiate corrective action.

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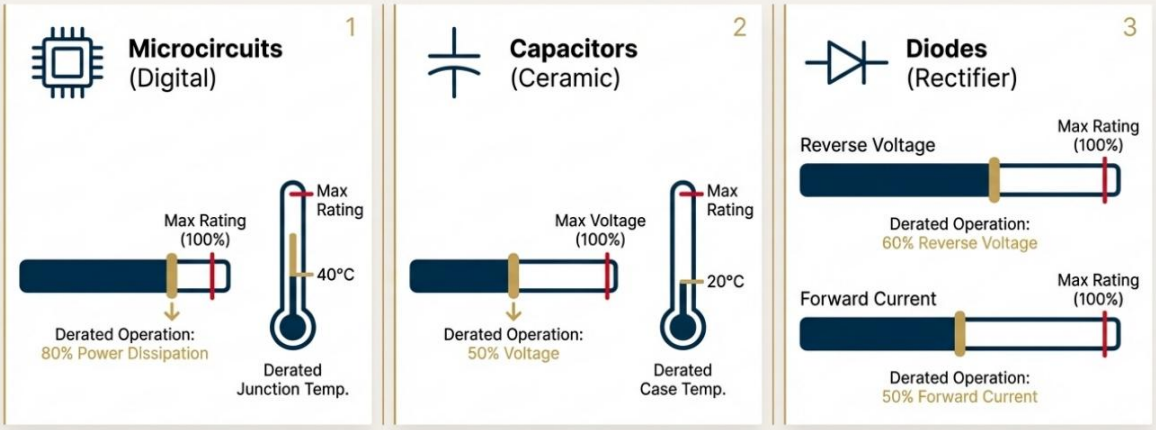
Designing for Margin: The Engineering Discipline of Derating

Derating is the practice of operating components at less than their maximum rated stress levels to increase reliability and extend service life. MIL-STD-11991B provides specific factors for critical components.



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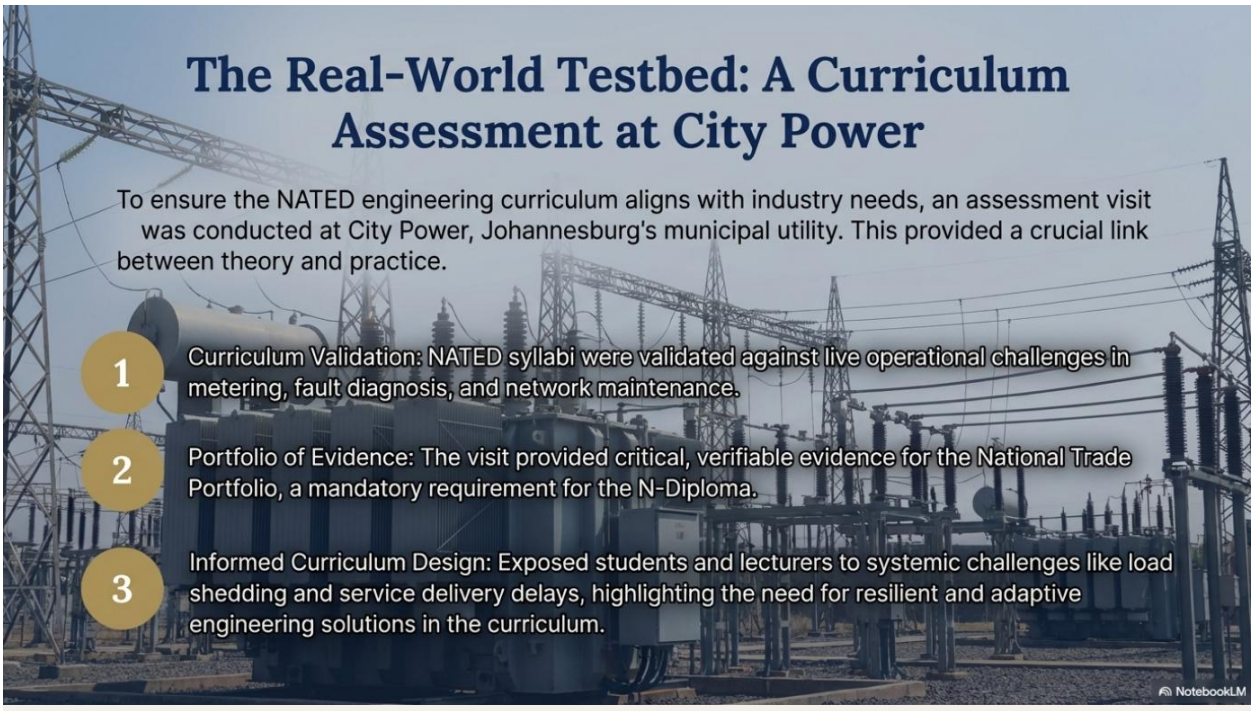
The Real-World Testbed: A Curriculum Assessment at City Power
To ensure the NATED engineering curriculum aligns with industry needs, an assessment visit was conducted at City Power, Johannesburg's municipal utility. This provided a crucial link between theory and practice.
1
Curriculum Validation: NATED syllabi were validated against live operational challenges in metering, fault diagnosis, and network maintenance.
2
Portfolio of Evidence: The visit provided critical, verifiable evidence for the National Trade Portfolio, a mandatory requirement for the N-Diploma.
3
Informed Curriculum Design: Exposed students and lecturers to systemic challenges like load shedding and service delivery delays, highlighting the need for resilient and adaptive engineering solutions in the curriculum.
NotebookLM

Synthesizing Global Standards: MIL-STD vs. IEC

An expert must operate across different regulatory landscapes. A comparison of MIL-STD-100G (US Defense) and IEC 62368-1 (International Safety) reveals key differences in philosophy and application.

	MIL-STD-100G	IEC 62368-1
Scope	Focuses on **Engineering Drawing Practices**, ensuring uniformity and interoperability for defense materiel.	A **Hazard-Based Safety Engineering (HBSE)** standard for audio/video and IT equipment, focused on preventing injury from energy sources.
Documentation Philosophy	Prescriptive about drawing formats, numbering, and revision control to support a multi-decade logistics chain.	Requires documentation that demonstrates risk analysis and mitigation (e.g., identifying energy sources, safeguards, and user classifications).
Qualification	Emphasizes qualification via Source Control Drawings and strict configuration management.	Focuses on testing and certification to prove compliance with safety requirements.

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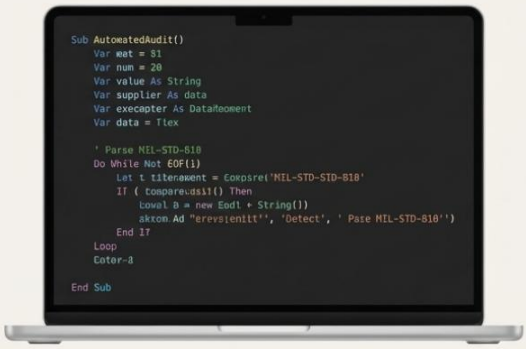
Automating Compliance: Building Audit-Ready Tools

To enhance efficiency and ensure repeatability in auditing, custom tools were developed using Visual Basic for Applications (VBA). This elevates compliance from a manual checklist to an automated, data-driven process.



Custom VBA Modules were developed to:

- **Automate Data Entry and Tracking:** Create standardized logs for suppliers, incoming inspection results, and defect tracking, minimizing human error.
- **Generate Dynamic Audit Checklists:** Parse standards like MIL-STD-810 directly from text into structured Excel checklists for environmental testing.
- **Visualize Decision Logic:** Implement logigrams (workflow maps) and algorigrams (decision-tree diagrams) to model complex processes like COTS acceptance or counterfeit detection.

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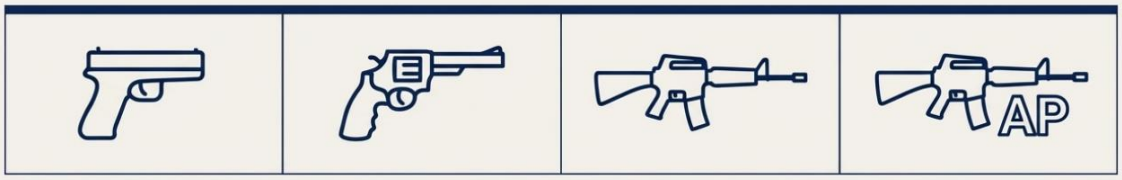
Beyond Components: Ensuring Operator Safety with NIJ Standards

A truly reliable system protects its users. The National Institute of Justice (NIJ) standard for ballistic resistance provides a clear classification system for body armor, ensuring predictable performance against specific threats.



Type IIA	Type IIIA	Type III	Type IV
Protects against 9mm and .40 S&W handgun rounds.	Highest level of handgun protection, stopping .357 SIG and .44 Magnum rounds.	Protects against 7.62mm rifle rounds (e.g., M80).	The highest rating, designed to defeat .30 caliber armor-piercing (AP) rifle rounds.

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The Synthesis of a Professional: An Integrated Portfolio of Expertise

The journey from student to practitioner culminates in the ability to integrate knowledge across multiple domains, applying theoretical frameworks to solve real-world problems

National Qualifications Framework
Mastery of SAQA/NATED educational structures and assessment policies.
Practical Industry Assessment
Proven ability to validate curriculum and gather evidence in live operational environments like City Power.
The Expert Assessor & Engineer
Military & Safety Standards
In-depth application of MIL-STD, IEC, and NIJ compliance requirements.
Quality System Auditing
Expertise in processes like incoming inspection, counterfeit detection, and supplier control.
Digital Tool Development
Capability to automate and scale compliance using custom software tools (VBA).

NotebookLM

Building the Next Generation of Experts

The journey of one expert provides a blueprint for improving how we train and equip future technologists and engineers.

1. Integrate Standards into Curricula

Vocational curricula (N1-Vocational curricula (N1-N6) should embed core concepts from MIL-STD and IEC standards early, connecting theory to high-reliability practice from day one.

2. Mandate Practical Industry Audits

Industry visits, like the one to City Power, must become a core, assessed component of every N-Diploma to ensure graduates are truly job-ready.

3. Foster Digital Literacy for Compliance

Equip students with foundational coding skills (VBA, Python) to empower them to build their own tools for automating audits and managing compliance data.

NotebookLM

Tshingombe Tshitadi

Expert Assessor & Engineer

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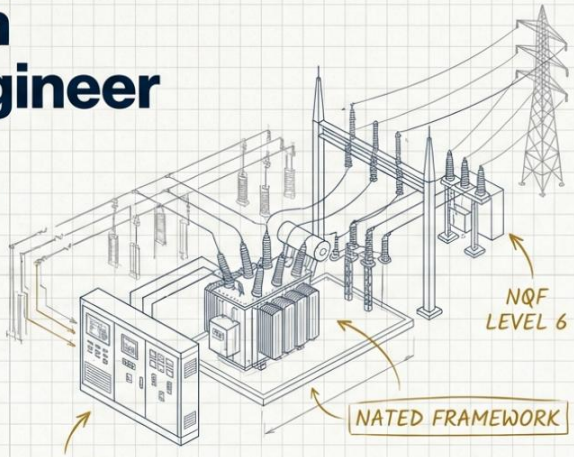
The Blueprint for an Industry-Ready Engineer

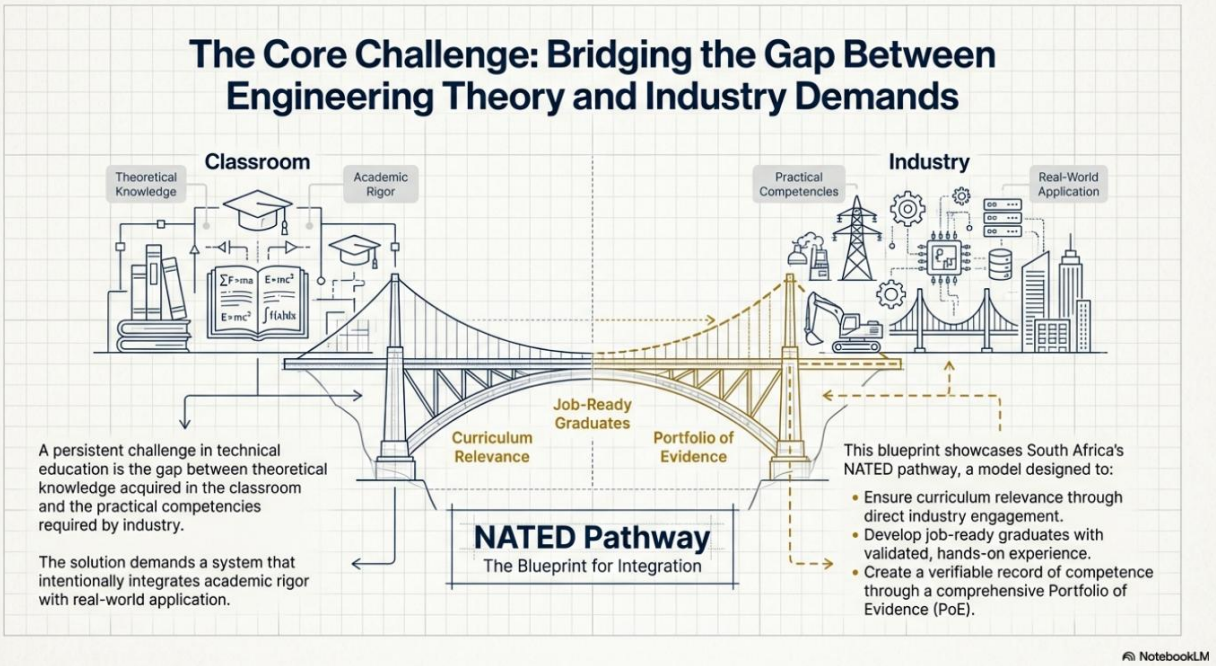
Tracing the South African NATED Pathway from Foundational Theory to National Diploma

This presentation deconstructs the rigorous journey of Tshingombe Tshitadi through South Africa's NATED engineering qualification. It serves as a blueprint, illustrating how a structured framework of theory, practical immersion, and robust assessment builds a competent, certified professional ready to meet industry demands.



PROTAGONIST:
TSHINGOMBE TSHITADI

NotebookLM


The Core Challenge: Bridging the Gap Between Engineering Theory and Industry Demands
Classroom
Theoretical Knowledge
Academic Rigor
Industry
Practical Competencies
Real-World Application
Job-Ready Graduates
Curriculum Relevance
Portfolio of Evidence
A persistent challenge in technical education is the gap between theoretical knowledge acquired in the classroom and the practical competencies required by industry.
The solution demands a system that intentionally integrates academic rigor with real-world application.
NATED Pathway
The Blueprint for Integration
This blueprint showcases South Africa's NATED pathway, a model designed to:
Ensure curriculum relevance through direct industry engagement.
Develop job-ready graduates with validated, hands-on experience.
Create a verifiable record of competence through a comprehensive Portfolio of Evidence (PoE).
NotebookLM

The Regulatory Architecture: SAQA, the NQF, and DHET

South Africa's qualifications are built on a foundation of rigorous national standards, ensuring quality, portability, and credibility.

SAQA (South African Qualifications Authority)
Oversees the development and implementation of the National Qualifications Framework.
NQF (National Qualifications Framework)
A ten-level system that classifies all registered qualifications, enabling clear pathways for learners.
Level 10
Level 9
Level 8
Level 7
National N Diploma
Level 6
NATED (Report 191) Programmes
Level 5
Level 4
Level 3
Level 2
Level 1
DHET (Department of Higher Education and Training)
Manages and provides quality assurance for NATED (Report 191) programmes, which are a core part of the Occupational Qualifications Sub-framework.
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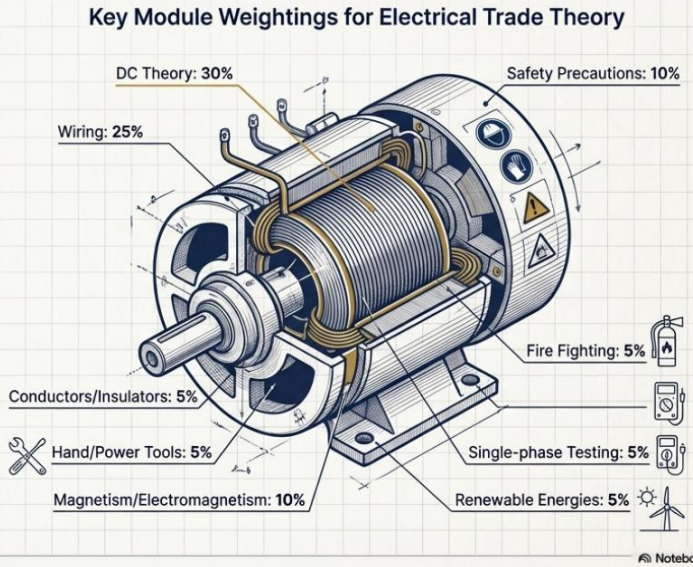
Phase 1: The Foundation – Building Core Competencies (N1–N3)

The journey begins with the N1 Certificate (SAQA ID 63375), establishing the essential theoretical and practical groundwork.

The curriculum for Electrical Trade Theory emphasizes core skills and safety from day one.

This structure ensures every student masters the fundamentals before advancing.



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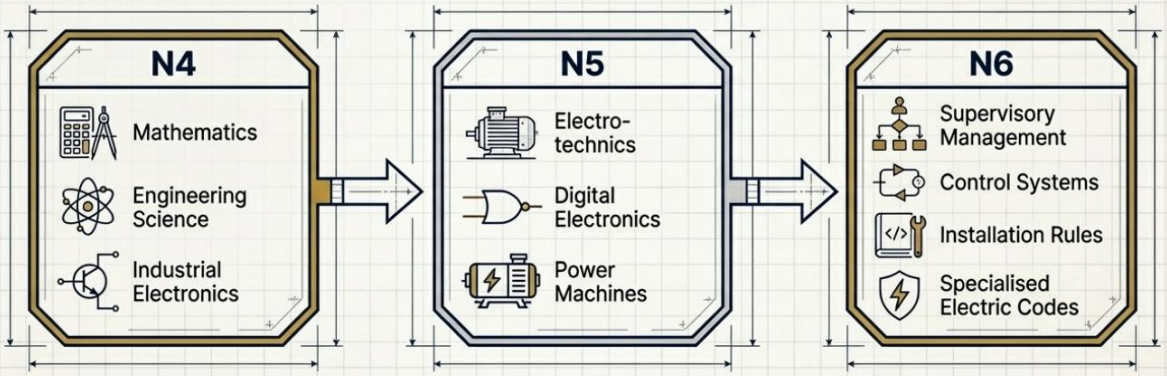
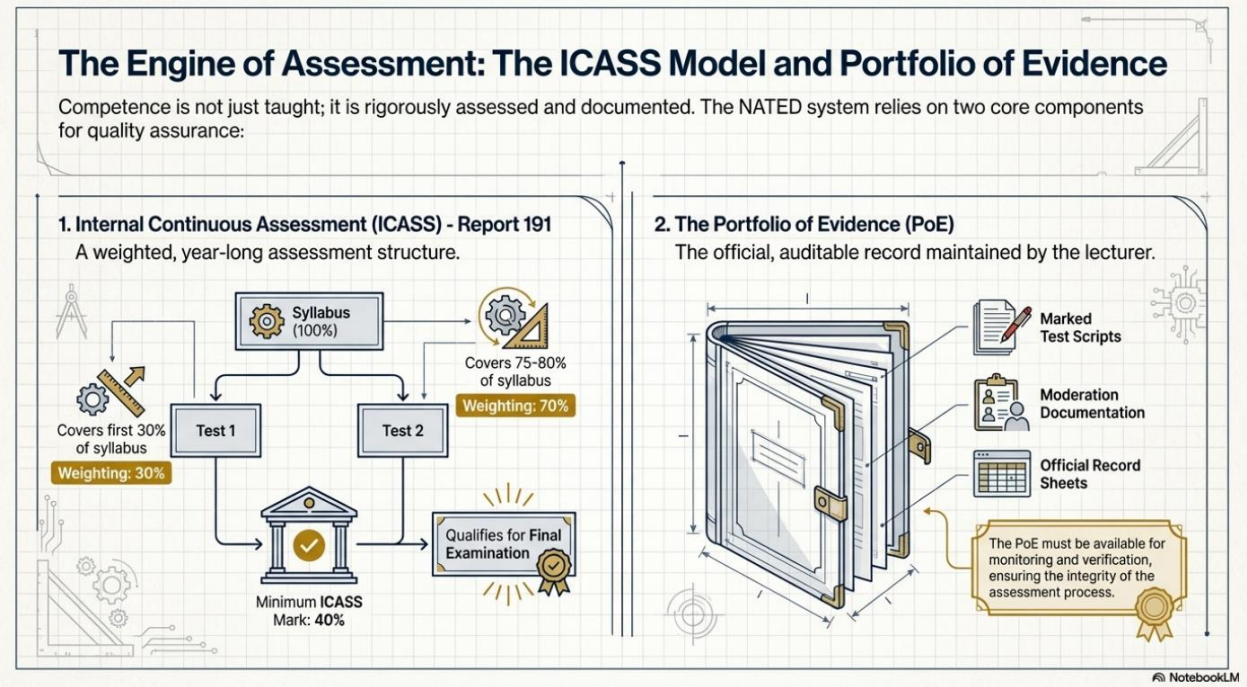
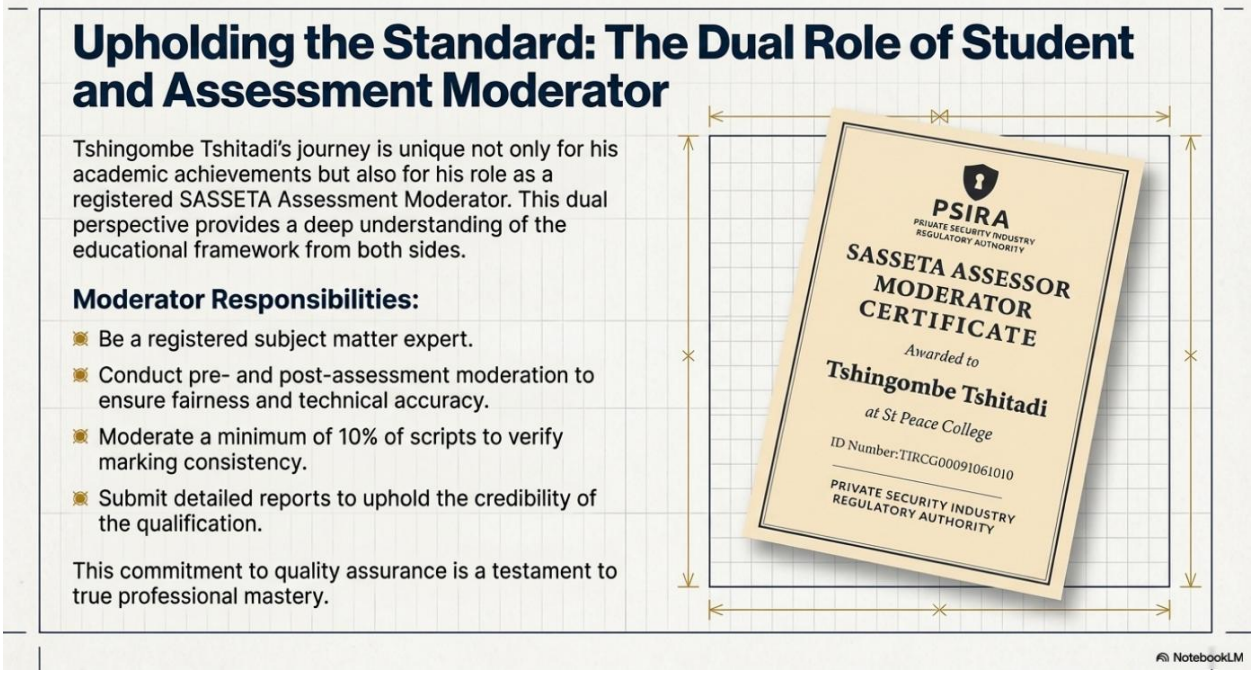
Phase 2: The Framework – Constructing Advanced Technical Knowledge (N4–N6)

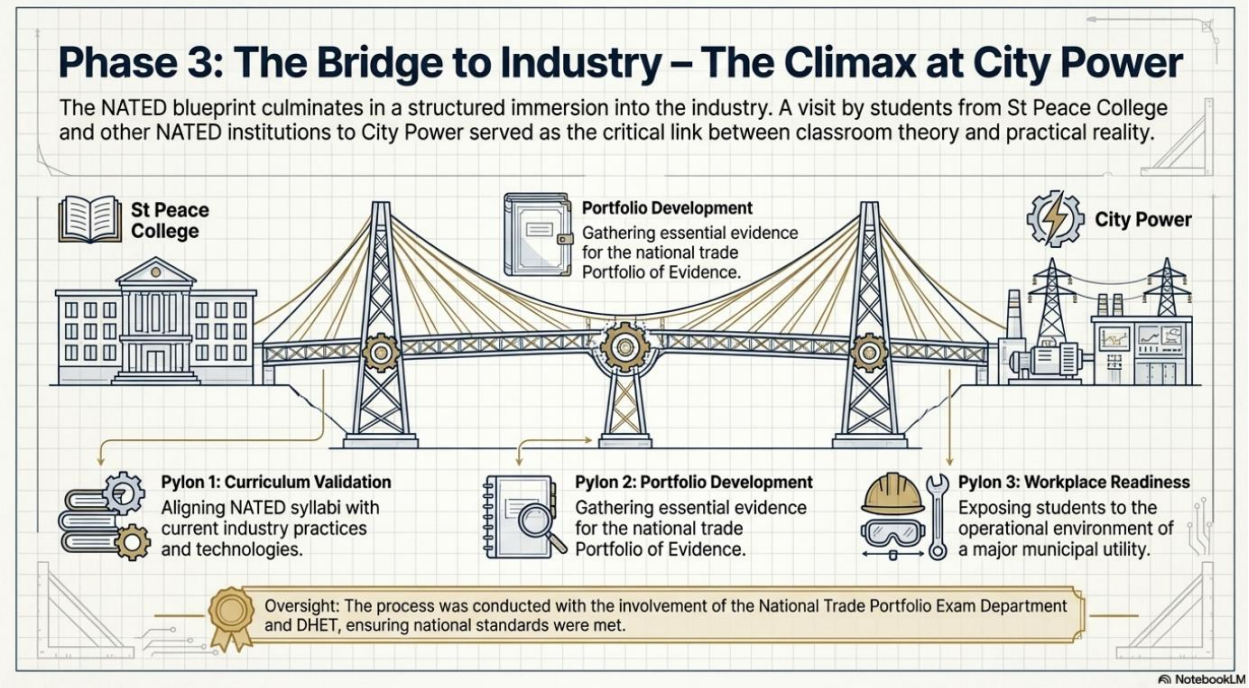
With the foundation secure, the learner progresses through N4, N5, and N6, each level building systematically on the last. This phase develops advanced technical knowledge and prepares the student for specialized industry roles. This structured academic progression is the theoretical backbone of the National N Diploma.

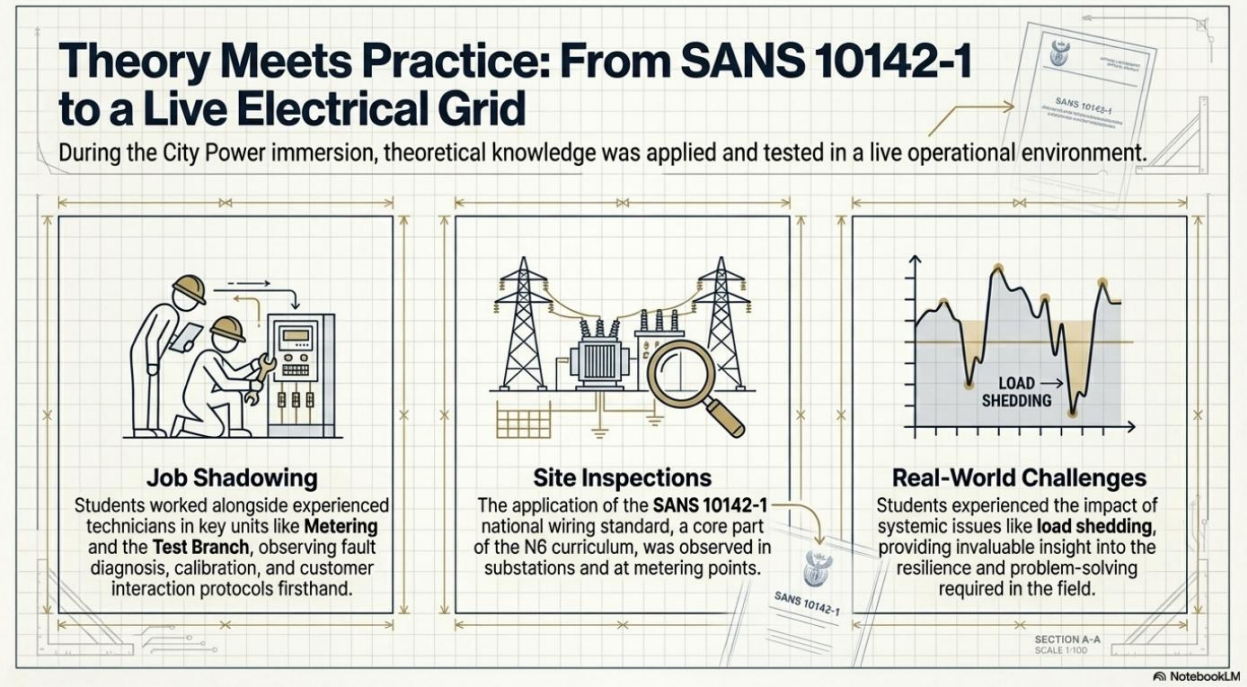


NotebookLM


The Engine of Assessment: The ICASS Model and Portfolio of Evidence
Competence is not just taught; it is rigorously assessed and documented. The NATED system relies on two core components for quality assurance:
1. Internal Continuous Assessment (ICASS) - Report 191
A weighted, year-long assessment structure.
Syllabus (100%)
Covers first 30% of syllabus
Weighting: 30%
Test 1
Test 2
Covers 75-80% of syllabus
Weighting: 70%
Minimum ICASS Mark: 40%
Qualifies for Final Examination
2. The Portfolio of Evidence (PoE)
The official, auditable record maintained by the lecturer.
Marked Test Scripts
Moderation Documentation
Official Record Sheets
The PoE must be available for monitoring and verification, ensuring the integrity of the assessment process.
NotebookLM


Upholding the Standard: The Dual Role of Student and Assessment Moderator
Tshingombe Tshitadi's journey is unique not only for his academic achievements but also for his role as a registered SASSETA Assessment Moderator. This dual perspective provides a deep understanding of the educational framework from both sides.
Moderator Responsibilities:
Be a registered subject matter expert.
Conduct pre- and post-assessment moderation to ensure fairness and technical accuracy.
Moderate a minimum of 10% of scripts to verify marking consistency.
Submit detailed reports to uphold the credibility of the qualification.
This commitment to quality assurance is a testament to true professional mastery.
PSIRA
PRIVATE SECURITY INDUSTRY REGULATORY AUTHORITY
SASSETA ASSESSOR MODERATOR CERTIFICATE
Awarded to
Tshingombe Tshitadi
at St Peace College
ID Number:TIRCG00091061010
PRIVATE SECURITY INDUSTRY REGULATORY AUTHORITY
NotebookLM

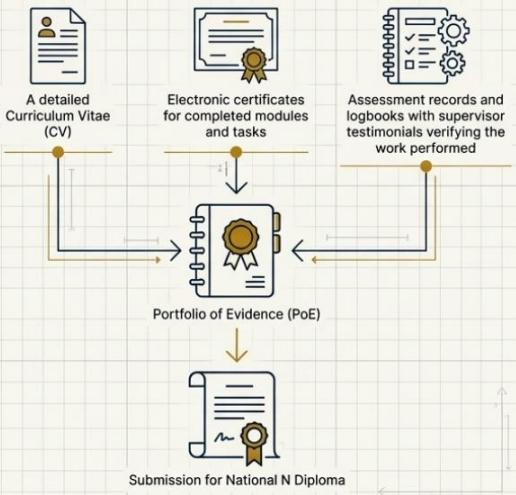

Phase 3: The Bridge to Industry – The Climax at City Power
The NATED blueprint culminates in a structured immersion into the industry. A visit by students from St Peace College and other NATED institutions to City Power served as the critical link between classroom theory and practical reality.
St Peace College
Portfolio Development
Gathering essential evidence for the national trade Portfolio of Evidence.
City Power
Pylon 1: Curriculum Validation
Aligning NATED syllabi with current industry practices and technologies.
Pylon 2: Portfolio Development
Gathering essential evidence for the national trade Portfolio of Evidence.
Pylon 3: Workplace Readiness
Exposing students to the operational environment of a major municipal utility.
Oversight: The process was conducted with the involvement of the National Trade Portfolio Exam Department and DHET, ensuring national standards were met.
NotebookLM


Theory Meets Practice: From SANS 10142-1 to a Live Electrical Grid
During the City Power immersion, theoretical knowledge was applied and tested in a live operational environment.
Job Shadowing
Students worked alongside experienced technicians in key units like Metering and the Test Branch, observing fault diagnosis, calibration, and customer interaction protocols firsthand.
Site Inspections
The application of the SANS 10142-1 national wiring standard, a core part of the N6 curriculum, was observed in substations and at metering points.
Real-World Challenges
Students experienced the impact of systemic issues like load shedding, providing invaluable insight into the resilience and problem-solving required in the field.
LOAD SHEDDING
SANS 10142-1
SECTION A-A
SCALE 1:100
NotebookLM

Documenting Mastery: Building the National Trade Portfolio

The practical experience at City Power is not just for exposure; it is a formal requirement for qualification. The activities directly contribute to the student's **Portfolio of Evidence (PoE)** and **logbook**.

The PoE serves as the comprehensive, auditable proof that the learner has translated theoretical knowledge into demonstrated competence.


A detailed Curriculum Vitae (CV)
Electronic certificates for completed modules and tasks
Assessment records and logbooks with supervisor testimonials verifying the work performed
Portfolio of Evidence (PoE)
Submission for National N Diploma

NotebookLM

The Final Output: The National N Diploma in Engineering (NQF Level 6)

The successful completion of the entire NATED pathway, including both academic and practical components, results in the award of the National N Diploma.

Qualification Details

- **Official Title:** National N Diploma: Engineering Studies
- **SAQA Qualification ID:** 90674
- **NQF Level: 6**
- **Minimum Credits:** 360

Structure for Award

Step 1:
Successful completion of N4, N5, and N6 Certificates

Step 2:
Submission and verification of **24 months (2,670 hours)** of relevant practical workplace experience

This qualification signifies a **professional** who is both **academically knowledgeable** and **industry-proven**.

NotebookLM

The Verified Record: A Synthesized Transcript of Achievement

Every step of the journey is documented and verifiable through the official DHET record, ensuring complete traceability.

Learner Record for Tshingombe Tshitadi	
SAQA Asset ID:	09121
SAQA Institution Code:	30_39
Assessment Policy:	IE099
Qualification SAQA ID:	90674 (National N Diploma Engineering)
Learner IDs:	2004007064381, 2100002023812
DHET Submission Status:	Submitted (as of 2024-02-12)
Timetable Reference:	/50111002

Synthesized Transcript Data

Level	Subject/Module	Status	Assessment
N1-N3	Electrical Trade Theory Foundation	Complete	ICASS/Exam
N4	Mathematics, Engineering Science, Ind. Elec.	Complete	ICASS/Exam
N5	Electro-technics, Digital Elec., Power Mach.	Complete	ICASS/Exam
N6	Sup. Management, Control Systems, Inst. Rules	Complete	ICASS/Exam
-	Practical Experience (24 Months)	Verified	Logbook/PoE
-	**Final Award: National N Diploma**	**Awarded	-

NotebookLM

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N6	Sup. Management, Control Systems, Inst. Rules	Complete	ICASS/Exam
-	Practical Experience (24 Months)	Verified	Logbook/PoE
-	**Final Award: National N Diploma**	**Awarded	-

NotebookLM

A Commitment to Continuous Professional Development

The National N Diploma is a cornerstone qualification, but true professionalism is defined by a commitment to lifelong learning and engagement with the broader industry. Tshingombe Tshitadi's record reflects this through multiple registrations and certifications.

COUNCIL ON HIGHER EDUCATION
CERTIFICATE OF RECORD
This is to certify that
Tshingombe Tshitadi
was registered in Career Development at St Peace College
ID Number: TIRCG0009161010
SOUTH AFRICAN COUNCIL FOR EDUCATORS
Microsoft
ECSA PORTAL CERTIFICATE
This is to certify that
Tshingombe Tshitadi
was registered in Career Development at St Peace College
ID Number: TIRCG0091061010
SOUTH AFRICAN COUNCIL FOR EDUCATORS
Schneider Electric South Africa
ECSA PORTAL CERTIFICATE
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ID Number: TIRCG0009161010
SOUTH AFRICAN COUNCIL FOR EDUCATORS
COUNCIL ON HIGHER EDUCATION
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SOUTH AFRICAN COUNCIL FOR EDUCATORS

Council on Higher Education: Certificate of Record for Career Development.

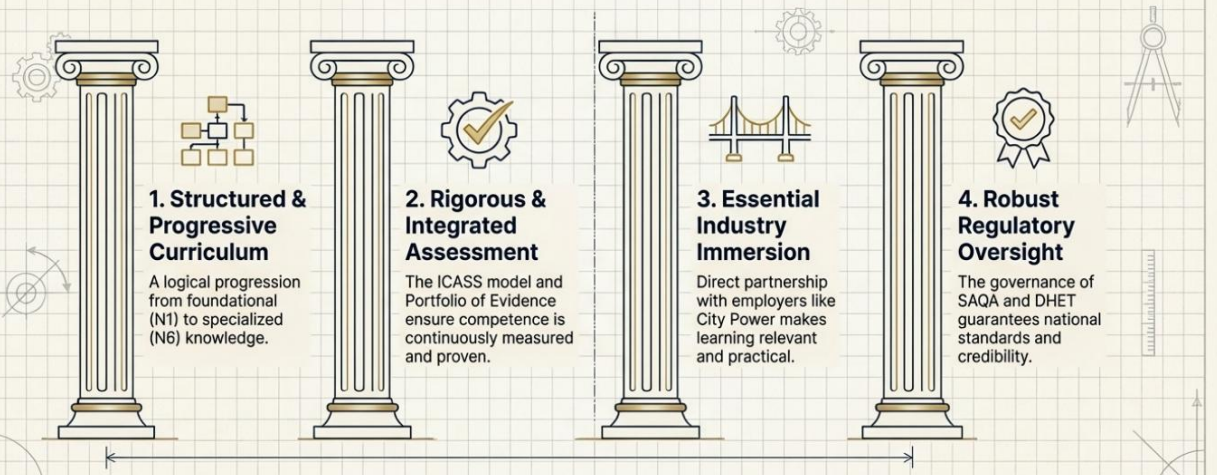
ECSA Portal Certificates: Engagement with the Engineering Council of South Africa's professional development platforms.

South African Council for Educators: Registration as an education professional.

NotebookLM

The Blueprint Deconstructed: The Four Pillars of Success

The NATED engineering pathway, as exemplified by this case study, is a successful model for developing industry-ready professionals. Its success rests on four essential pillars:



1. Structured & Progressive Curriculum

A logical progression from foundational (N1) to specialized (N6) knowledge.

2. Rigorous & Integrated Assessment

The ICASS model and Portfolio of Evidence ensure competence is continuously measured and proven.

3. Essential Industry Immersion

Direct partnership with employers like City Power makes learning relevant and practical.

4. Robust Regulatory Oversight

The governance of SAQA and DHET guarantees national standards and credibility.

NotebookLM

From Blueprint to Bedrock: Building South Africa's Engineering Future

The rigorous, integrated, and industry-aligned NATED pathway is more than an educational program—it is the bedrock upon which South Africa's technical capability is built. By transforming students into competent, certified, and industry-ready professionals, this blueprint is fundamental to driving innovation and securing the nation's engineering future.

NotebookLM

Anatomy of an Engineering Qualification: A Learner's Journey

Learner Profile & Key Credentials

Tshingombe Tshitadi: Engineering Student & Assessment Moderator

Holds qualifications from institutions like St Peace College under various regulatory bodies.

National N Diploma in Engineering (NQF Level 6)

A SAQA-registered qualification (ID 90674) requiring 360 minimum credits.

Certified SASSETA Assessor Moderator

Registered with the Private Security Industry Regulatory Authority (PSIRA)

The NATED Qualification Framework

The Path to a National N Diploma

Rigorous Assessment Structure (ICASS)

40% Minimum Required based on weighted tests

Core Engineering Curriculum

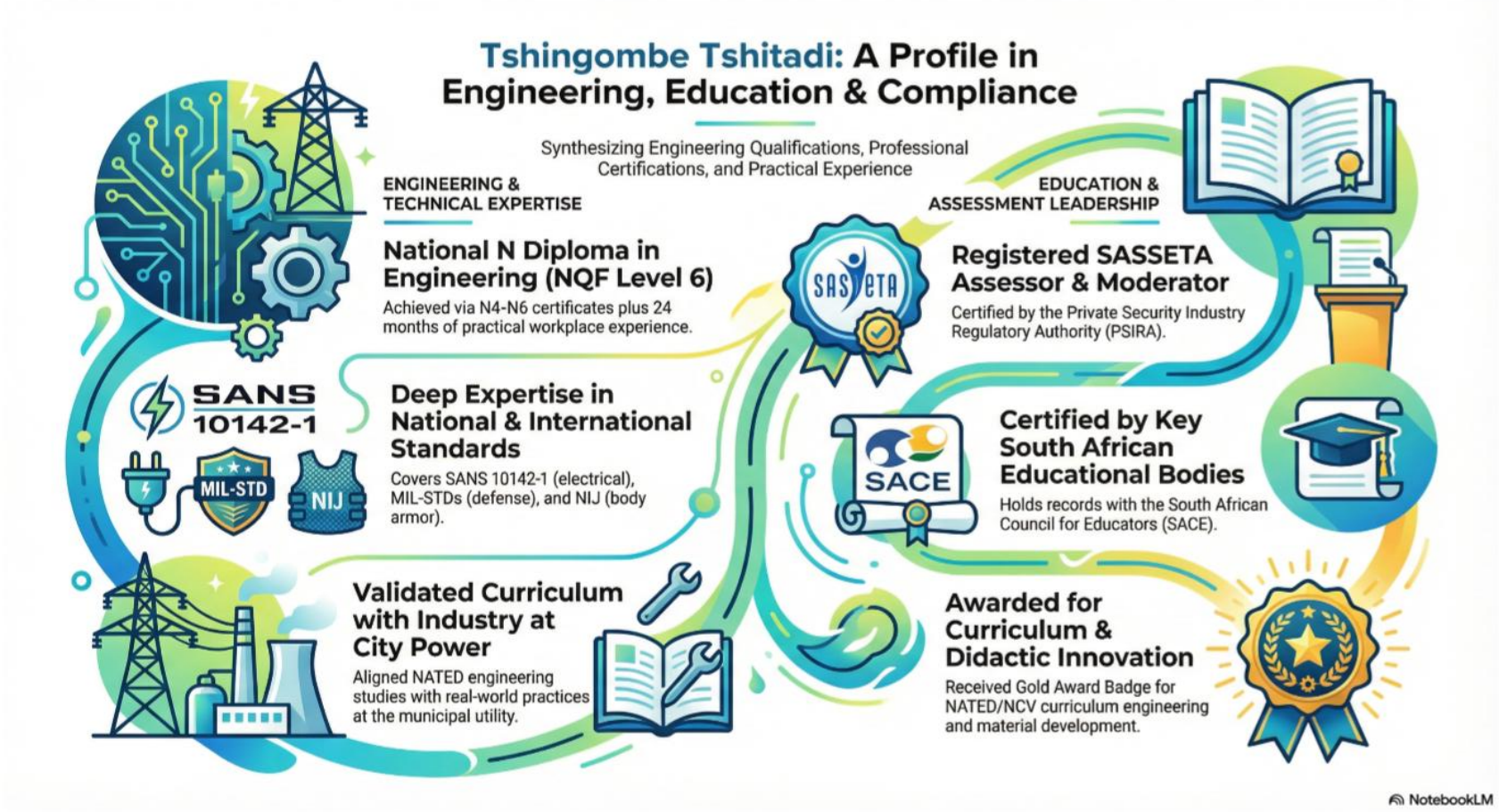
Industrial Electronics

Electro-technics

Power Machines

Control Systems

NotebookLM


Tshingombe Tshitadi: A Profile in Engineering, Education & Compliance
Synthesizing Engineering Qualifications, Professional Certifications, and Practical Experience
ENGINEERING & TECHNICAL EXPERTISE
EDUCATION & ASSESSMENT LEADERSHIP
National N Diploma in Engineering (NQF Level 6)
Achieved via N4-N6 certificates plus 24 months of practical workplace experience.
Registered SASSETA Assessor & Moderator
Certified by the Private Security Industry Regulatory Authority (PSIRA).
SANS 10142-1
MIL-STD
NIJ
Deep Expertise in National & International Standards
Covers SANS 10142-1 (electrical), MIL-STDs (defense), and NIJ (body armor).
SACE
Certified by Key South African Educational Bodies
Holds records with the South African Council for Educators (SACE).
Validated Curriculum with Industry at City Power
Aligned NATED engineering studies with real-world practices at the municipal utility.
Awarded for Curriculum & Didactic Innovation
Received Gold Award Badge for NATED/NCV curriculum engineering and material development.
NotebookLM

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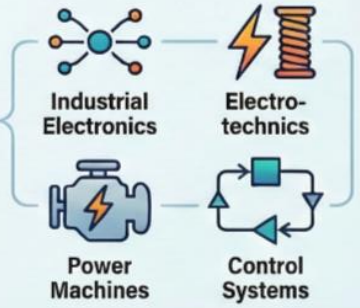
The NATED Qualification Framework

The Path to a National N Diploma

Rigorous Assessment Structure (ICASS)

Core Engineering Curriculum



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The Engineer's Odyssey: A Systems Thinker's Approach to Solving South Africa's Challenges

A portfolio of evidence showcasing the integration of Electrical Engineering, Security Systems Analysis, and Educational Framework Design.

This presentation documents the journey of Tshingombe Tshitadi, an engineer who views South Africa's most pressing issues—from energy instability to public safety—not as isolated problems, but as interconnected systems requiring a multifaceted analytical approach.

NotebookLM

A Dual Foundation: Engineering Precision and Policing Principles.

Core Engineering Competencies
Neue Haas Grotesk Display Bold

- Electrical Trade Theory
- Industrial Electronics
- Engineering Science & Drawing
- Mathematics
- Electrotechnology & Electrotechnics
- Practical Electrical Wiring & Construction

Frameworks for System Integrity
Neue Haas Grotesk Display Bold

- Crime Scene & Incident Investigation
- Investigative Methods and Techniques
- Paralegal Low Justice
- Applied Policing & Crime Prevention
- Firearm Study Material & Forensics

Key Takeaway: Educated at St. Peace College and Africa Policing Institute, Tshingombe developed a unique perspective: how to build a system (engineering) and how to protect it (policing).

NotebookLM

Obstacles as a Catalyst for Deeper System Analysis

The journey to formal qualification encountered significant administrative hurdles within the national framework. These backlogs, rather than halting progress, sparked a rigorous investigation into the mechanics of the educational system itself.

SAQA Evaluation Files

`ref:_00D205o40._5004JYEzA3:ref`
`SAQA APPLICATION 20191130002`
`202001305040/ 201911130002`

"Student name tshingombe : tshitadi applying for diploma engineering electrical study... waiting for result of your diplomat for to council and release your result hand over certificate."

This experience transformed a personal challenge into an intellectual mission: to deconstruct and understand the systems governing education, assessment, and qualification.

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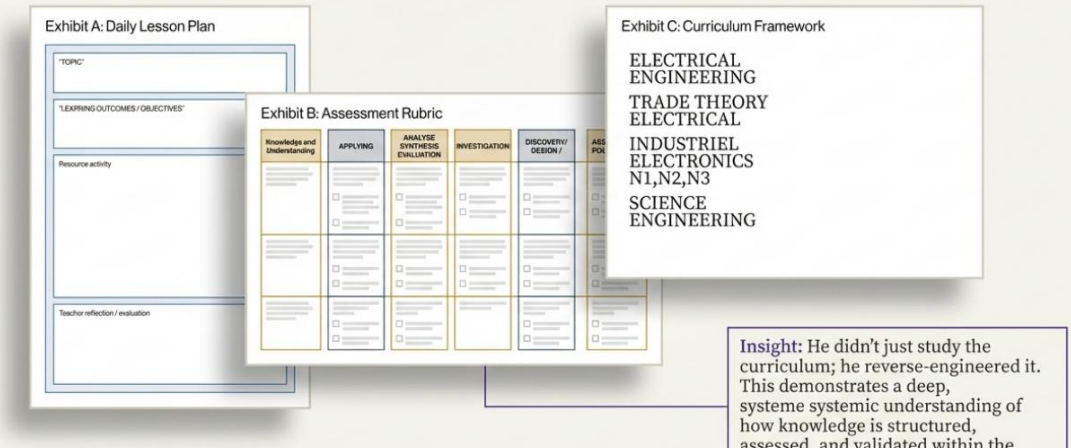
Deconstructing the System: A Portfolio of Educational Design



Insight: He didn't just study the curriculum; he reverse-engineered it. This demonstrates a deep, systeme systemic understanding of how knowledge is structured, assessed, and validated within the TVET/DHET framework.

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Pillar I: Interrogating the South African Energy Crisis.

Problem Statement

South Africa's economic stability is inextricably linked to the reliability of its power grid. Persistent load shedding and infrastructure challenges at Eskom and City Power are not just technical failures, but complex systemic problems.

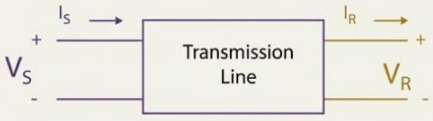
Tshingombe's Approach

My research focuses on moving beyond temporary fixes to model and analyze the fundamental weaknesses in the grid, from generation to distribution.

Key Areas of Investigation

- Smart Grid Technology to reduce energy losses.
- Feasibility of Renewable Energy Integration (Solar, Wind).
- Grid Stability and Load Balancing under peak demand.
- Analysis of cascading failures leading to blackouts.

The Engineer's Toolkit: Applying First Principles to Grid Instability.



Quantifying Energy Loss

$$\text{Power Loss} = I^2R$$

This fundamental law is used to calculate and pinpoint energy losses in Eskom's transmission lines, identifying critical areas for infrastructure upgrades.

Modeling System Resistance

$$R_T = R_0(1 + \alpha_{at})$$

Modeling how temperature affects the resistance of field coils in motors and generators, crucial for predicting equipment failure and maintenance needs.

Analyzing AC Power Flow

$$P = VI * \cos(\varphi)$$

Calculating the active power flow in the grid to assess system stability, manage load effectively, and improve the overall power factor for greater efficiency.

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A Research Agenda for a Modernized Grid

Analysis extends to evaluating best-in-class global technologies and their applicability to the South African context.

Schneider Electric

Energy Optimization in Configured Systems

Compare the energy efficiency of systems configured using Schneider's simulation tools versus traditional methods to quantify potential operational savings for local infrastructure.

EATON

Sustainability in Product Usage

Investigate how Eaton's training on renewable solutions (solar inverters, energy-efficient transformers) can be adapted for upskilling South African technicians.

Microsoft Azure

IoT Integration for Smart Grid Systems

Study how Azure IoT Edge devices can be configured to improve real-time energy distribution monitoring and fault detection on the City Power network.

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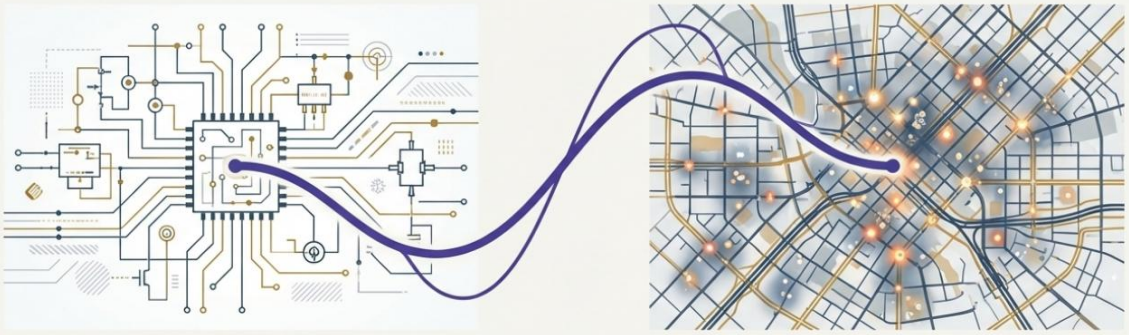
Pillar II: Engineering Security, Securing Systems



Central Assertion: A system, whether electrical or societal, is only as strong as its security. The principles of engineering—analysis, modeling, and fault detection—can be powerfully applied to the challenges of public safety and policing.

From Fault Detection to Crime Prevention:
Applying diagnostic thinking to identify patterns and predict points of failure in public safety.

From System Optimization to Resource Allocation:
Using data to deploy policing resources more effectively.

From Regulatory Frameworks to Rule of Law:
Understanding that both engineering and policing operate within strict, structured rule-based systems.

NotebookLM

A Quantitative Approach to Crime Analysis.

Moving beyond traditional methods to apply a data-driven framework for investigation and incident analysis.

1. Statistical Reporting

"statistic report : carmine academic excel, guard repor number attendance ,number complain, number probability, investigation ruling statistic point..."

2. Geospatial & Temporal Analysis

"...coordination x, y map show,, graphical, name bridge adess brigade complain poin equation coordinate matrice line colone complain..."

3. Predictive Modeling

"...investigation histogram equation quadratic, plot math curriculum time came outcome , investigation event action going..."

This methodology transforms incident reports from simple narratives into a multi-dimensional dataset, enabling predictive analysis and strategic intervention.

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Pillar III: Building Human Capital—The Core of Any System

Advanced technology and robust security frameworks are ineffective without the skilled professionals to build, maintain, and operate them. The most critical infrastructure is a well-educated workforce.

From DHET/SAQA Analysis:
My investigation into educational backlogs led to a framework for improving TVET curriculum design and assessment to better align with industry needs (MERSETA, SASSETA).

From Eskom/Eaton Research:
Analysis of corporate training models reveals pathways for creating effective **mentorship and bursary** programs that address critical skill gaps in the energy sector.

Synthesis:
A holistic national strategy must integrate technical training, safety protocols, and continuous professional development.

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The Drive to Apply: Seeking to Contribute to National Systems.

Exhibit A
Application to City Power

Position:
Manager ICT Security

Key Requirement:
Develops best practices for all aspects of data security, including physical, network, database and application.

City Power
Johannesburg

Shows his ambition to merge his engineering and security skills at a critical utility.
in Source Serif Pro Regular

Demonstrates his interest in understanding international policing standards and technologies.

Exhibit B
Engagement with Met Police (UK)

Candidate added to Talent Bank.

Exhibit C
Seeking Professional Guidance

LiveChat with CareerHelp.org.za
CareerHelp.org.za

"i need advice career development n diploma engineering electrical , back log isita certificate graduate ... job experimental theoretical practical , career "

Highlights his self-awareness and commitment to continuous development.

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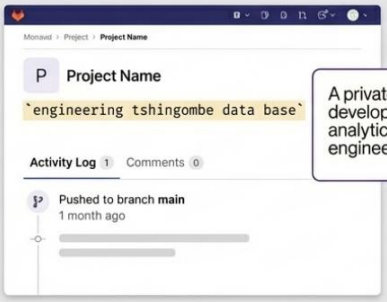
Kananga5

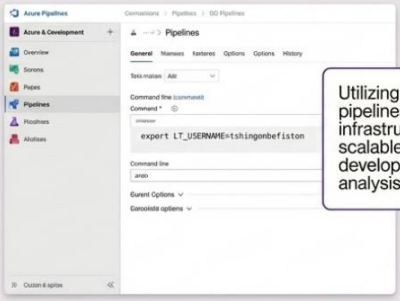
Building the Tools: The 'Kananga5' Digital Workspace.

Source Serif Pro Regular
GitLab Repository



A private repository for developing and managing analytical models and engineering databases.

Source Serif Pro Regular
Azure & Cloud Development



Utilizing modern CI/CD pipelines and cloud infrastructure for scalable project development and data analysis.

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A Vision for a Resilient and Efficient South Africa.

My purpose is to leverage a unique synthesis of skills to address South Africa's systemic challenges:

1. **Re-engineering the Energy Grid**
   Applying rigorous analysis and modern technology to build a stable, efficient, and sustainable power infrastructure.
2. **Implementing Data-Driven Security**
   Transforming public safety through quantitative analysis, predictive modeling, and the integration of technology into policing.
3. **Architecting Human Potential**
   Designing and refining educational and training frameworks that produce the next generation of skilled engineers and system guardians.

This is not three separate career paths. It is one integrated mission.

NotebookLM

Tshingombe Tshitadi

Systems Analyst | Electrical Engineer | Security Framework Designer

Email: tshingombefiston@gmail.com
Phone: 0725298946

View Projects & Research

gitlab.com/Kananga5

Building • Analyzing • Securing

NotebookLM

The Persistent Engineer

A Journey of Skill, Resilience, and Vision in South Africa's Energy Sector

Name: Tshingombe Tshitadi
Core Expertise: Electrical Engineering, Systems Analysis, Security Integration
Contact: tshingombefiston@gmail.com | +27 72 529 8946

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Engineering a Reliable and Sustainable Energy Future for South Africa

My journey is driven by a commitment to solving complex challenges in the electrical engineering field. I leverage deep technical knowledge, a resilient character forged through adversity, and a systems-based approach to build a more reliable and sustainable energy future for the nation.

Lifelong Learning: A continuous pursuit of knowledge across disciplines.

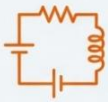
Practical Application: Bridging theory with real-world implementation.

Systemic Problem-Solving: Understanding and addressing interconnected challenges.

NotebookLM

A Comprehensive Foundation in Electrical Engineering

A summary of the core theoretical and practical knowledge gained through the N1-N6 Electrical Engineering studies.



Circuit Analysis & Electronics

- Ohm's & Kirchhoff's Laws
- RLC Circuits & AC/DC Theory
- Series & Parallel Installations
- Thermoelectric Cooling (Peltier Elements)

Power Systems

- Generation, Transmission & Distribution
- Transformers (Single-phase & Three-phase)
- Switchgear & Protective Devices (Induction Disc Relays)
- Fault Analysis & Symmetrical Components

Digital Systems & Logic Design

- Binary Systems (Bits, Bytes, Nibbles)
- Boolean Algebra & Bitwise Operators (AND, OR, XOR)
- Karnaugh Mapping (SOP & POS simplification)

Applied Mathematics & Physics

- Differential Equations for Circuit Analysis (e.g., `L.d2/D2+R.di/St+1/c= linear`)
- Electromagnetism & Conductor Physics
- Applied Thermodynamics (Heat Transfer, Steam Generators)

NotebookLM

A Record of Perseverance: Navigating Systemic Hurdles

Successfully navigating the complexities of academic administration, including assessment irregularities and qualification backlogs, has honed my skills in advocacy, documentation, and procedural diligence. This experience demonstrates a deep commitment to fair process and achieving stated goals despite obstacles.

2019

Enrolment at St Peace College for Nated Engineering Studies (N1-N6).

2022

Identified and initiated appeals regarding assessment irregularities and invalid subject results (e.g., Electrical Trade Theory N3).

2022-2024

Proactive engagement with DHET, SAQA, QCTO, and Umalusi to rectify records.

Present (2025)

Actively pursuing final N Diploma ratification, combining theoretical coursework with practical experience requirements.

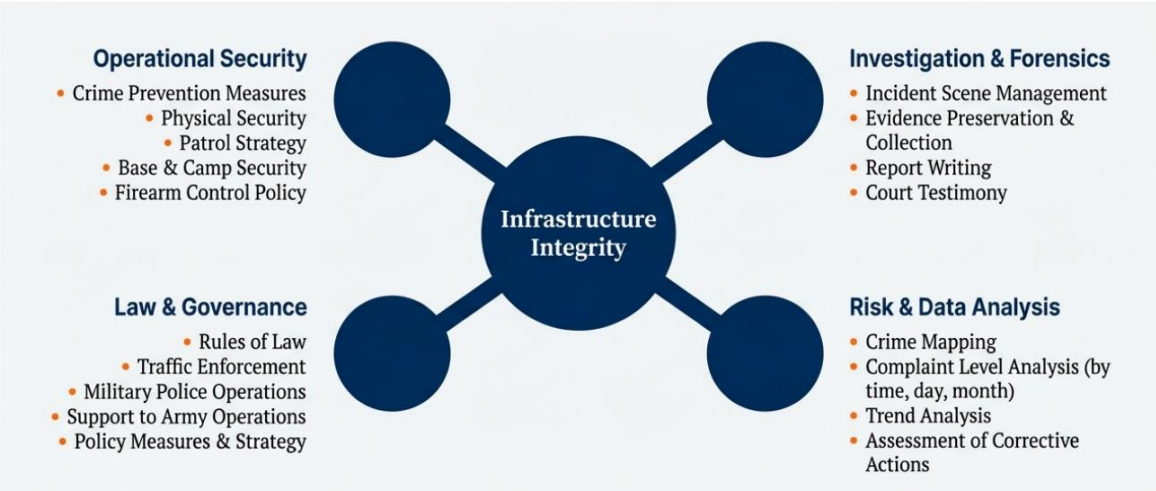
Demonstrated Attributes

Resilience, Attention to Detail, Procedural Advocacy, Unwavering Commitment.

NotebookLM

Integrating Engineering with Security & Governance

A modern engineer must understand the systems they operate within. My studies extend to policing, security, and risk management, providing a unique perspective on infrastructure protection, operational integrity, and policy implementation.



NotebookLM

The Modern Engineer's Toolkit: From Theory to Implementation

Design & Documentation

- Engineering Drawing & Geometrical Construction
- Computer-Aided Design (CAD)
- Interpreting Manufacturer Specifications & Site Plans
- Technical Documentation & Report Writing

IT & Data Systems

- Network Architecture Principles (Azure, GitHub)
- Information Management Systems (Police Station & Student Databases)
- Cybersecurity Principles for Smart Infrastructure
- Microsoft Tools (Excel for reporting, Visual Studio for deployment)

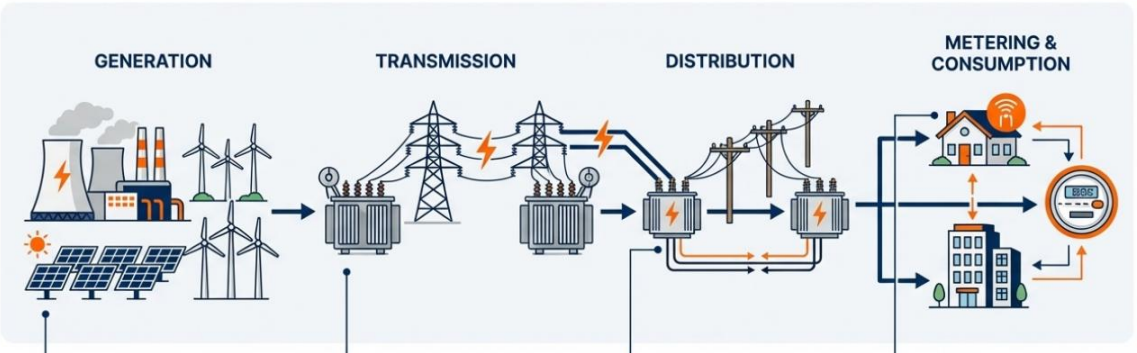
Project Execution

- Project Framework & Qualification Implementation
- Assessment & Moderation Policies
- Stakeholder Communication (Verbal & Non-Verbal)
- Workplace Communication (Work Orders, Change Orders, Memos)

NotebookLM

Understanding the Grid: From Generation to Consumption

A concise explanation of the end-to-end electrical power system, referencing key players like Eskom and City Power.


GENERATION
TRANSMISSION
DISTRIBUTION
METERING & CONSUMPTION
Power Stations (Coal, Nuclear, Hydro), Renewable Sources (Solar Farms, Wind Farms).
Step-Up Transformers, High-Voltage AC lines (e.g., 765, 500, 345 kV).
Substations, Step-Down Transformers, Primary & Secondary Customer lines.
Customer Connections (SPU/LPU), Smart Metering (AMI), Billing Systems, Prepaid Vending, Load Management.

NotebookLM

Building the Future: The Entrepreneurial Vision

Beyond seeking a role, I am building a vision. My entrepreneurial studies and the founding of 'Tshingombe Tshitadi Engineering' reflect a drive to create innovative solutions and contribute directly to the industry.

AIU
Atlantic International University
CERTIFICATE
OF PARTICIPATION
This certificate is proudly presented to:
tshingombe tshitadi
For participating in the Class:
From Idea to Reality: A Comprehensive Guide to Setting Up Your Own Company
LIVE CLASS
Throughout the duration of the live class session celebrated on 13-Oct-2023, the participant demenstrated a commitment to learning, actively engaged in class discussions and committed to after class

Continuing Education

Certificate of Participation
Class: 'From Idea to Reality: A Comprehensive Guide to Setting Up Your Own Company'
Institution: Atlantic International University (AIU)
Date: 13-Oct-2023

Company Registered

Name: Tshingombe Tshitadi Engineering
Tax Reference Number: 9722328238

NotebookLM

Ready to Contribute: Key Areas of Impact

Smart Grid Development

Improving grid reliability and efficiency through the design and implementation of Advanced Metering Infrastructure (AMI), data analysis, and modern control systems.

Critical Infrastructure Security

Applying a systems-thinking approach that integrates physical security measures, crime prevention strategies, and cybersecurity principles to protect critical assets from threats.

Renewable Energy Integration

Providing technical expertise in the design, planning, and project management required to integrate renewable sources (solar, wind) into the existing grid, supporting a just and sustainable transition.

Operational Efficiency & Revenue Recuperation

Leveraging data management and process control skills to reduce technical and non-technical losses, improve billing accuracy, and support revenue collection efforts as seen with City Power.

NotebookLM

The Engineer for the Future: Resilient, Multi-Disciprilinary, and Mission-Driven

The challenges facing South Africa's energy sector require more than traditional engineering. They demand a new approach—one that combines deep technical knowledge with an understanding of security, policy, and data systems. My journey has uniquely equipped me with this multi-disciplinary toolkit, ready to build a more resilient and efficient energy landscape.

Tshingombe Tshitadi • tshingombefiston@gmail.com • +27 72 529 8946 • GitHub: Kananga5

NotebookLM

The Persistent Engineer

A Journey of Skill, Resilience, and Vesion in South Africa's Energy Sector

Name:
Tshingombe Tshitadi

Core Expertise:
Electrical Engineering, Systems Analysis, Security Integration.

NotebookLM

Engineering a Reliable Future for South Africa

My journey is driven by a commitment to solving the complex challenges in South Africa's energy landscape. This requires more than just technical knowledge; it demands a resilient, systems-based approach to build a more reliable and sustainable future, addressing issues from loadshedding to aging infrastructure.

Lifelong Learning
Embracing continuous growth to stay ahead of evolving technologies.

Practical Application
Translating engineering theories into tangible, effective solutions.

Systemic Problem-Solving
Navigating intricate systems to identify root causes and optimize performance.

NotebookLM

The Blueprint: A Foundation in Electrical Engineering

Circuit Analysis & Theory

- Ohm's & Kirchhoff's Laws (KVL/KCL)
- RLC Circuit Analysis & Differential Equations ($L.d^2/dt^2+R.di/dt+1/c$)
- AC/DC Power Calculations ($P=VI$, $P=I^2R$)

Power Systems & Machinery

- Generation, Transmission & Distribution
- Transformers (Primary & Secondary)
- Three-Phase AC Systems & Synchronous Generators

Digital Logic & Electronics

- Boolean Algebra & Binary Systems (Bits, Nibbles, Bytes)
- Karnaugh Mapping for Logic Simplification
- Microcontrollers & Industrial Electronics

Applied Mathematics & Physics

- Electromagnetism & Thermodynamics
- Signal Processing (Z-transform, Filter Design)
- Strength of Materials & Mechanical Properties

NotebookLM

Navigating Systemic Hurdles: A Record of Perseverance

Successfully navigating the complexities of academic administration, including assessment irregularities and qualification backlogs, has honed my skills in advocacy, documentation, and commitment to fair process.

2019 — Enrolment at St Peace College (N1-N6 Studies).

2022 — Identified and initiated appeals regarding assessment irregularities (e.g., November 2023 exam results not released, N3 Electrical Trade Theory invalidation).

2022-2024 — Engaged with DHET, SAQA, QCTO, and Umalusi to rectify records.

2025 — Actively pursuing final N Diploma (NQF Level 6/7) ratification based on completed coursework and pending practical experience validation.

Demonstrated Competencies

- Resilience
- Attention to Detail
- Procedural Diligence

NotebookLM

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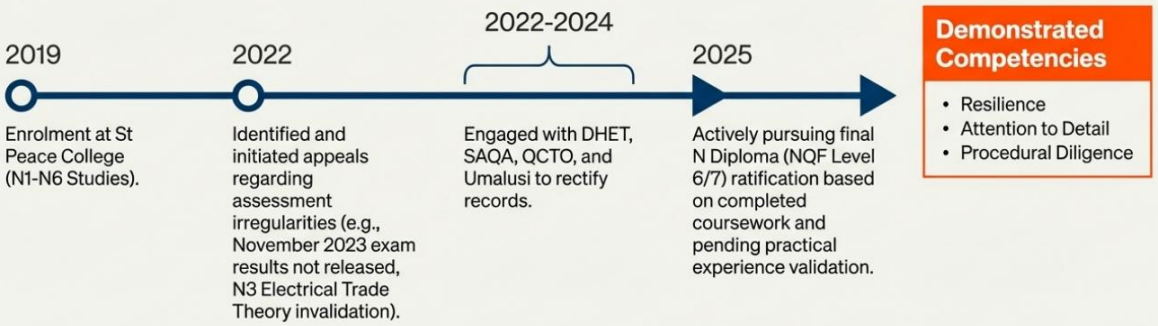
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NotebookLM

Integrating Engineering with Security & Governance

A modern engineer must understand the systems they operate within. My studies in policing, security, and risk management provide a unique perspective on infrastructure protection and operational integrity.

NotebookLM

The Modern Engineer's Toolkit: From Theory to Implementation

Design & Documentation

Engineering Drawing (Orthographic, Isometric) & Geometrical Construction

Computer-Aided Design (CAD)

Reading and Applying Manufacturer Specifications

IT & Data Systems

Network Architecture & Cloud Platforms (Azure, GitHub)

Information Management & Database Systems

Cybersecurity Principles for Smart Infrastructure

Project Management & Professional Practice

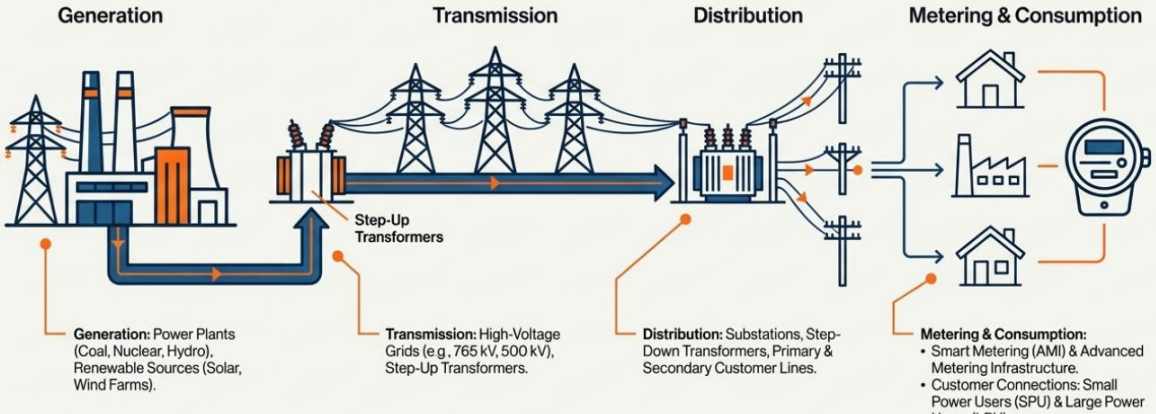
Project Frameworks & Qualification Implementation

Assessment, Moderation, and Quality Assurance

Stakeholder Communication & Writing Job Documents (Work Orders, Reports)

NotebookLM

Understanding the Grid: From the Generating Station to the Smart Meter


Generation
Transmission
Distribution
Metering & Consumption
Step-Up Transformers
Generation: Power Plants (Coal, Nuclear, Hydro), Renewable Sources (Solar, Wind Farms).
Transmission: High-Voltage Grids (e.g., 765 kV, 500 kV), Step-Up Transformers.
Distribution: Substations, Step-Down Transformers, Primary & Secondary Customer Lines.
Metering & Consumption:
• Smart Metering (AMI) & Advanced Metering Infrastructure.
• Customer Connections: Small Power Users (SPU) & Large Power Users (LPU).
• Billing Systems, Load Management, and Revenue Recuperation.

NotebookLM

Building the Future: Tshingombe Tshitadi Engineering

Beyond seeking a role, I am building a vision. My entrepreneurial studies and the founding of "Tshingombe Tshitadi Engineering" reflect a drive to create innovative solutions and contribute directly to the industry's evolution.

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Evidence & Credentials

Company Registered: Tshingombe Tshitadi Engineering
Tax Reference Number: 9722328238

Certificate of Participation
"From Idea to Reality: A Comprehensive Guide to Setting Up Your Own Company" Atlantic International University (13 Oct 2023)

NotebookLM

Ready to Contribute and Add Value

Smart Grid Development

Improving grid reliability and efficiency through smart metering (AMI), data analysis, and modern control systems.

Infrastructure Security

Applying a systems-thinking approach to protect critical assets from physical and cyber threats, integrating engineering with security protocols.

Renewable Energy Integration

Providing technical expertise and project management for the integration of solar, wind, and other sustainable energy sources into the national grid.

Operational Efficiency

Developing strategies for reducing technical and non-technical losses and improving revenue recuperation through better data management and process control.

NotebookLM

Let's Connect

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Email: tshingombefiston@gmail.com

Phone: +27 72 529 8946

Professional Profiles: GitHub: Kananga5

NotebookLM